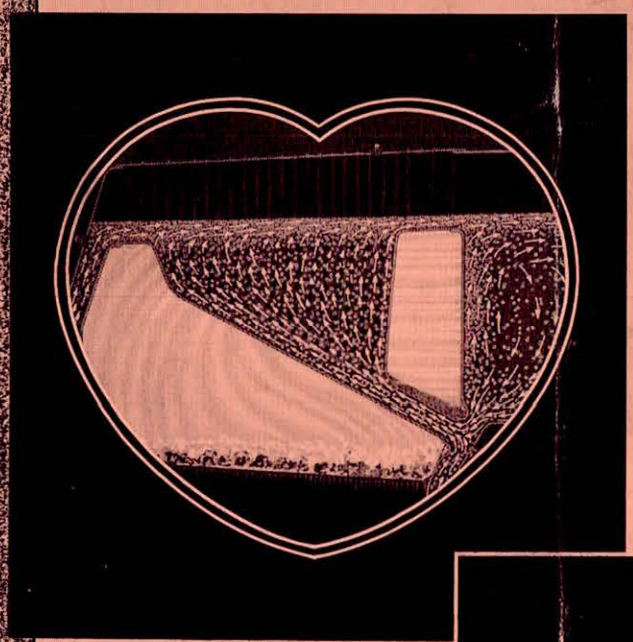
OCTOBER 31, 1931

Railway Age

Founded In 1856

Increasing Savings

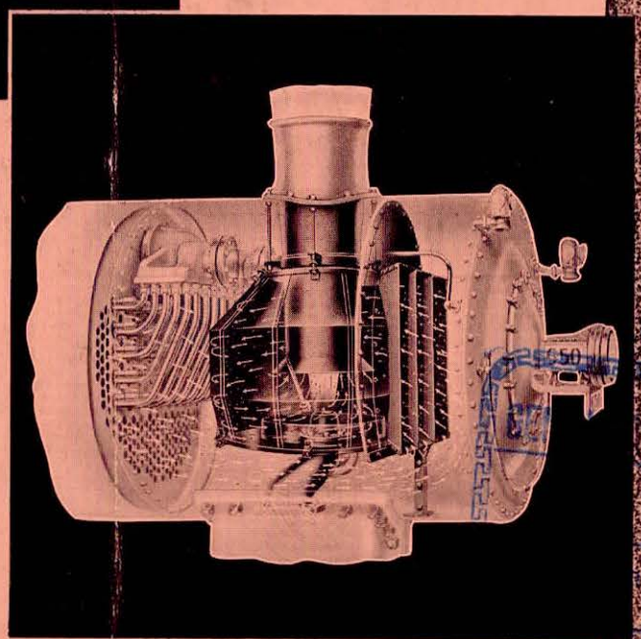


Nicholson Thermic
SYPHONS
"The Heart of the Locomotive"

By adding effective heating surface and creating rapid circulation, Syphons increase locomotive boiler efficiency 8.47%. They improve locomotive performance, reduce maintenance costs and provide unfailing safety. Syphons are recognized standard for old and new passenger, freight and switching locomotives.

CYCLONE
Spark Arresters

The cyclonic movement of the gases and cinders breaks up and quenches the sparks without use of netting and with no restriction of draft. Permits use of semi-bituminous or lignite coal without sparks. The Cyclone Spark Arrester is invaluable in territories where fire hazards are extreme. Now in service on more than 400 locomotives.



LOCOMOTIVE FIREBOX COMPANY

NEW YORK CHICAGO MONTREAL

Alphabetical Index to Advertisers—Page 40

Buyers Directory of Advertisers—Page 33

Improved
FREIGHT CAR CONSTRUCTION
demands *approved* sheets and plates

ARMCO

RAILROAD PRODUCTS

MADE BY CONTINUOUS PROCESS

Special Car Siding Sheets
Locomotive Jacket Sheets
Freight Car Sheets and Plates
Passenger Car Sheets and Plates
Galvanized Ingot Iron and Steel Sheets
Hot Rolled Ingot Iron and Steel Sheets

•

Wrought Steel Wheels

ON THE AIR

every Monday night
the ARMCO CONCERT BAND
thru WLW—700 kc.
W8XAL—6060 kc. (short wave)

9 o'clock—Eastern Time
8 o'clock—Central Time
7 o'clock—Mountain Time
6 o'clock—Pacific Time

YOUR critical standards will not permit any loose or makeshift construction methods in freight cars. Neither should it permit inferior metals to creep in under the guise of good quality and thus jeopardize your service-return.

You can guard against such an eventuality by choosing Armco plates and sheets for your hoppers, gondolas, box cars, and refrigerator cars. There is a suitable grade for every purpose, and each is produced expressly for inexpensive fabrication and lowest possible cost per ton-mile of service.

We shall be glad to discuss with you, or with your Mechanical and Supply departments, the substantial savings that are possible with Armco sheets and plates. Just address the nearest office.

ARMCO RAILROAD SALES CO.

Executive Offices: MIDDLETOWN, OHIO

DISTRICT OFFICES:

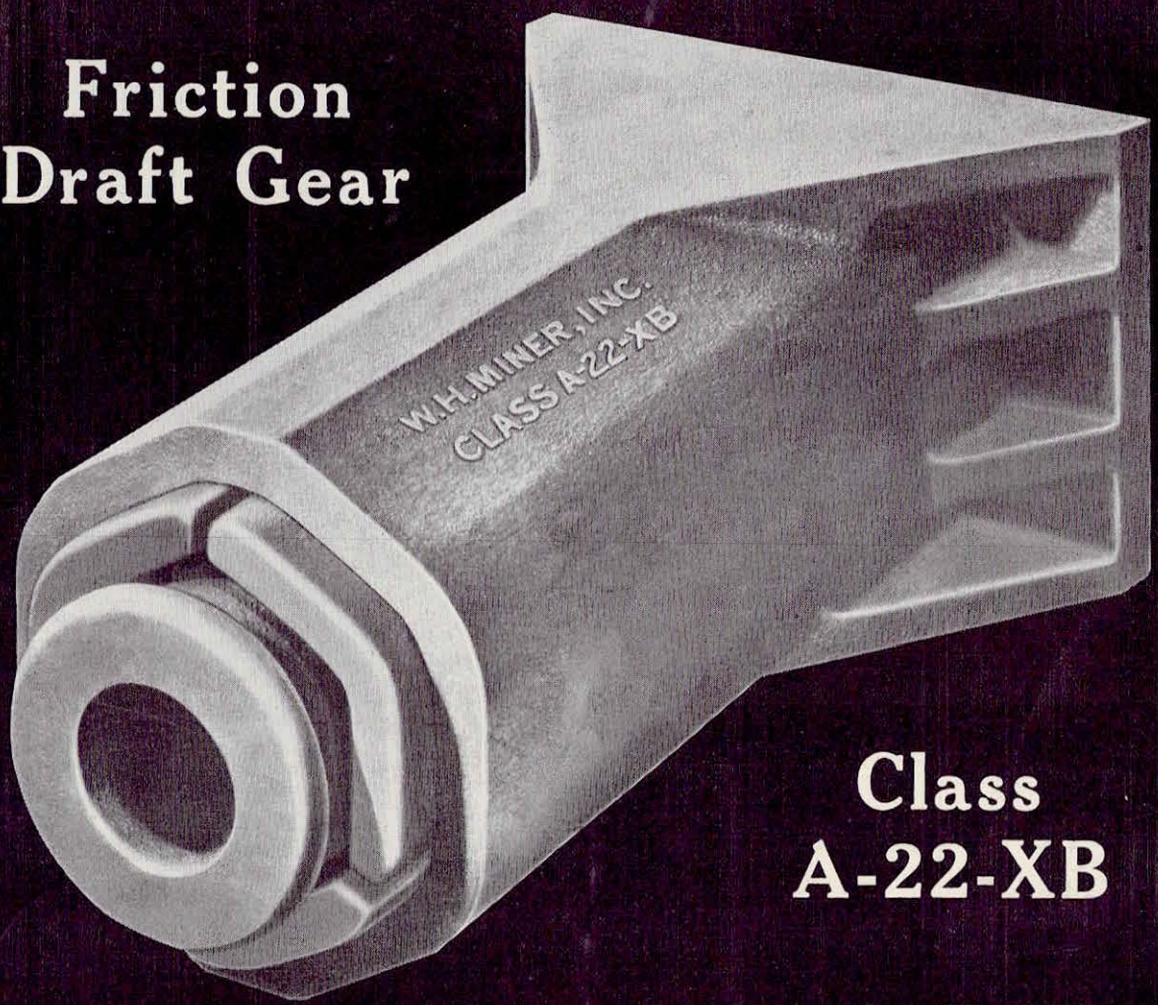
Chicago . New York . Philadelphia . Cleveland . St. Louis

ARMCO
IRON AND STEEL
SHEETS FOR EXACTING RAILROAD USES PLATES

Published weekly by Simmons-Boardman Publishing Company, 34 North Crystal Street, East Stroudsburg, Pa. Entered as second class matter, March 9, 1928, at the Post Office at East Stroudsburg, Pa., under the act of March 3, 1879.
Address communications to 30 Church St., New York City.

MINER

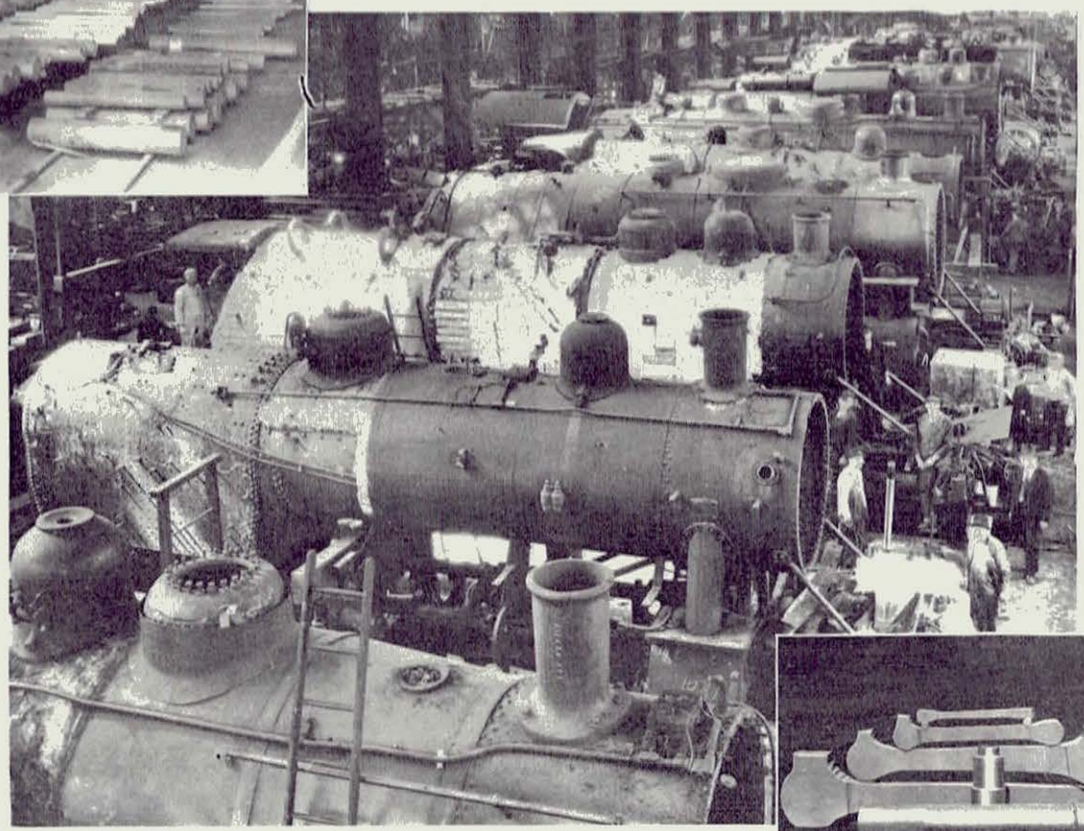
Friction Draft Gear



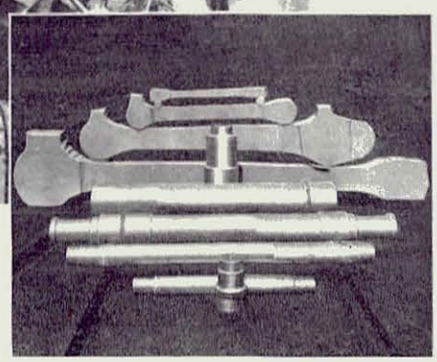
Class A-22-XB

Never in the history of railroading has conservation been more important than it is at the present time. Systematic shock prevention with Miner friction gears is a very profitable form of conservation and will produce results in terms of decreased maintenance and reduced freight claims. Miner gears provide maximum economy because of low cost and unequalled service value.

W. H. MINER, INC. CHICAGO



Ewing Galloway



The maintenance of locomotives and the frequency of repairs and replacements depends upon the parts used. "Standard" parts are dependable. They combine long life with safety and economy.

Tires
Rolled Wheels
Steel Tired Wheels
Forgings
Steel Castings
Billets

STANDARD STEEL WORKS COMPANY

GENERAL OFFICE & WORKS: BURNHAM, PENNA.

CHICAGO
NEW YORK
PHILADELPHIA

ST. LOUIS

AKRON
PORTLAND
SAN FRANCISCO

Published every Saturday by the Simmons-Boardman Publishing Company, 34 North Crystal Street, East Stroudsburg, Pa., with executive offices at 30 Church Street, New York

All communications should be addressed to the New York office, 30 Church Street, or to the Chicago office, 105 West Adams Street

SAMUEL O. DUNN, *Chairman of Board*
HENRY LEE, *President*
LUCIUS B. SHERMAN, *Vice-Pres.*
CECIL R. MILLS, *Vice-Pres.*
ROY V. WRIGHT, *Vice-Pres. and Sec.*
FREDERICK H. THOMPSON, *Vice-Pres.*
GEORGE SLATE, *Vice-Pres.*
ELMER T. HOWSON, *Vice-Pres.*
F. C. KOCH, *Vice-Pres.*
JOHN T. DEMOTT, *Treas.*

CHICAGO
105 West Adams St.

WASHINGTON
17th and H. Streets, N. W.

CLEVELAND
Terminal Tower

SAN FRANCISCO
215 Market St.

Editorial Staff

SAMUEL O. DUNN, *Editor*
ROY V. WRIGHT, *Managing Editor*
ELMER T. HOWSON, *Western Editor*
H. F. LANE, *Washington Editor*

B. B. ADAMS
C. B. PECK
W. S. LACHER
ALFRED G. OEHLER
F. W. KRAEGER
E. L. WOODWARD
J. G. LYNE
J. H. DUNN
D. A. STEEL
R. A. DOSTER
JOHN C. EMERY
MARION B. RICHARDSON
H. C. WILCOX
NEAL D. HOWARD
CHARLES LAYNG
GEORGE E. BOYD
WALTER J. TAFT
GARDNER C. HUDSON
M. H. DICK

The Railway Age is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.)

Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free: United States and Mexico, $6.00; Canada, including duty, $8.00. Foreign countries, not including daily editions, $8.00.

Single copies, 25 cents each.

Railway Age

With which are incorporated the Railway Review, the Railroad Gazette and the Railway Age-Gazette. Name Registered U. S. Patent Office

Vol. 91 October 31, 1931 No. 18

In This Issue

Save Money in Handling Material ..... Page 661

This, the seventeenth article in the Operating Economy Series, points out the opportunities for economies offered by modern machines for the construction and maintenance of tracks and bridges.

Motorized Material Handling Well Developed on C. & O. 667

Tells how the systematic operation of tractor equipment has benefitted the Chesapeake & Ohio's supply and shop work at Huntington, W. Va., and Russell, Ky.

Three Air-Conditioned Trains Operated by the Baltimore & Ohio 675

A description of the York system of air-conditioning, as used by the Baltimore & Ohio on cars in its "Columbian" and other trains.

EDITORIALS

The Opinion in the Rate Advance Case 657
Drainage Pays 660

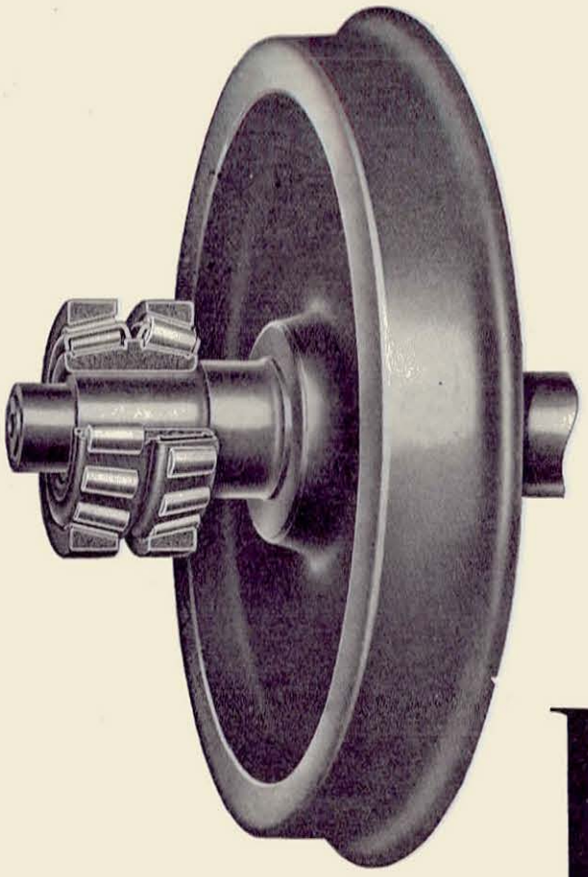
GENERAL ARTICLES

Save Money in Handling Material 661
Passenger Men Favor National Advertising Program 665
Motorized Material Handling Well Developed on C. & O. 667
Detroit Hearing on Operating Practices 672
Short Lines Consider Railway Situation 673
Three Air-Conditioned Trains Operated by the Baltimore & Ohio 675
A. R. A. and National Safety Sections to be Merged 677
W. S. Franklin Elected President of Wabash and Ann Arbor 679
State Commissioners Meet 680
Freight Car Loading 684
Proposed Legislation 684
Roads Propose Rate Pool Be Loaned 685
A Large Capacity Five-Inch Sand Valve 686

ODDS AND ENDS 686

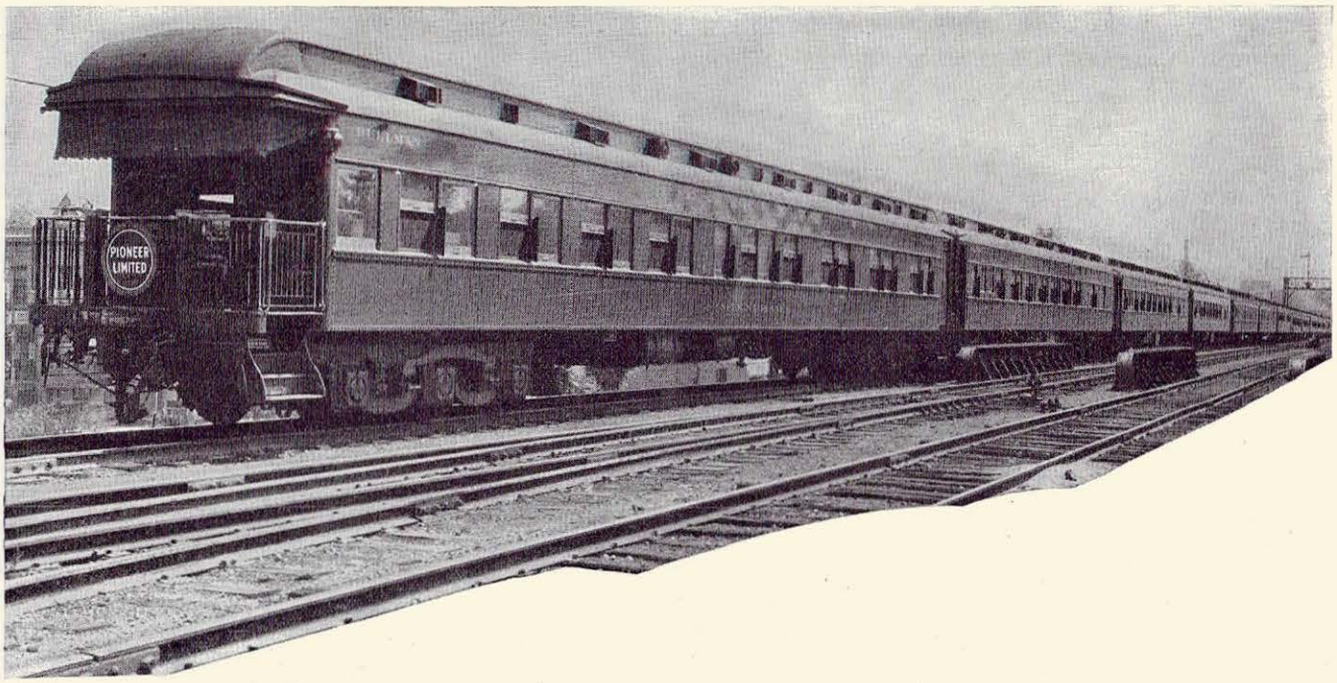
NEWS 687

The Railway Age is indexed by the Industrial Arts Index and also by the Engineering Index Service



Proved

TIMKEN *Tapered Roller*



Performance

Timken Tapered Roller Bearings are in use on 148 steam and electric railroads. Their dependability and many practical and economic advantages have been definitely established through years of service on all types of rolling stock under every running condition.

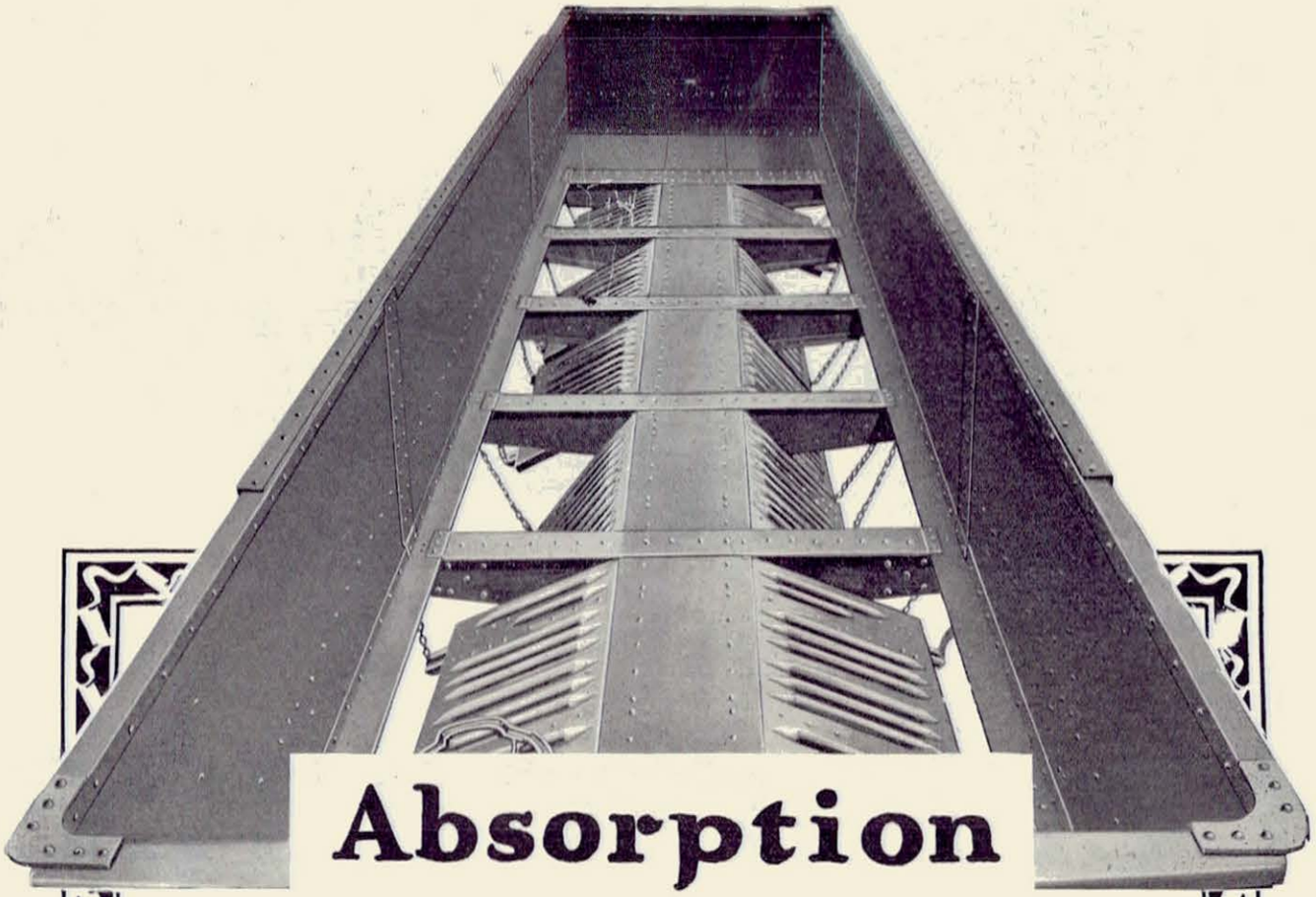
Operating officials know how Timken Roller Bearings cut costs by eliminating friction, preventing wear, abolishing hot boxes, saving lubricant and reducing starting resistance 88%.

Passenger agents know how Timken Roller Bearing trains attract patronage by their smooth, comfortable, restful riding.

These proved Timken benefits are available to every railroad.

The Timken Roller Bearing Company, Canton, Ohio.

BEARINGS



Absorption

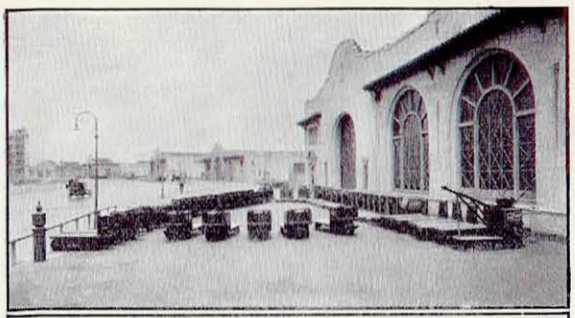
Crushed stone dropped by a steam shovel on the floor of a car delivers an enormous blow. One of the main reasons for using Ajax Corrugated Doors is their ability to absorb such blows without distortion.

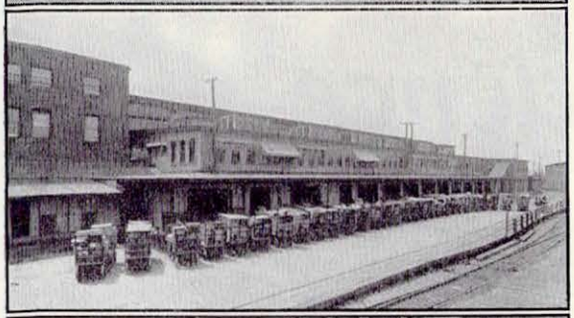
AJAX

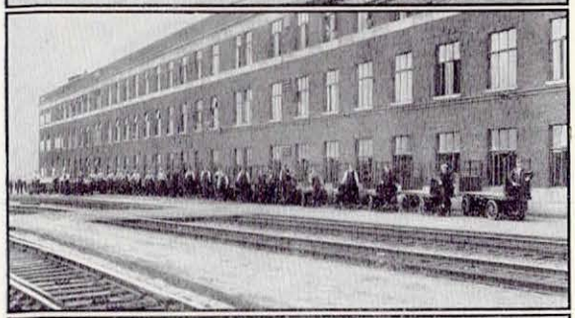
CORRUGATED DROP DOORS

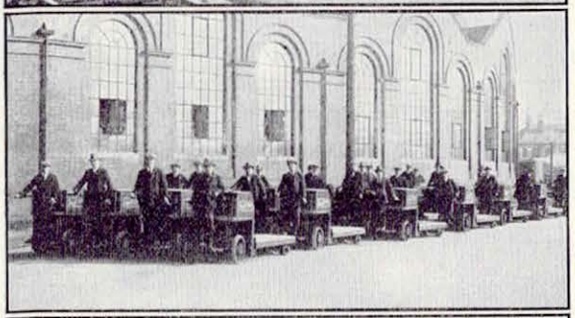
UNION METAL PRODUCTS COMPANY

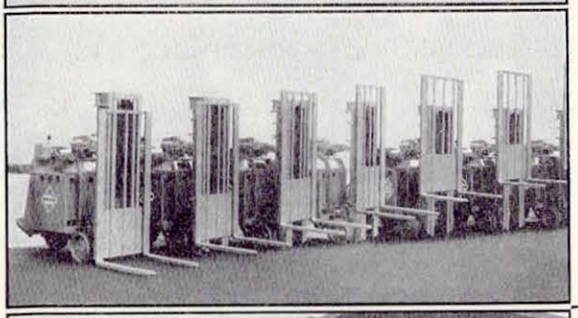
NEW YORK • CHICAGO • ST. LOUIS • WASHINGTON • RICHMOND
HOUSTON • SAN FRANCISCO • KANSAS CITY • MONTREAL

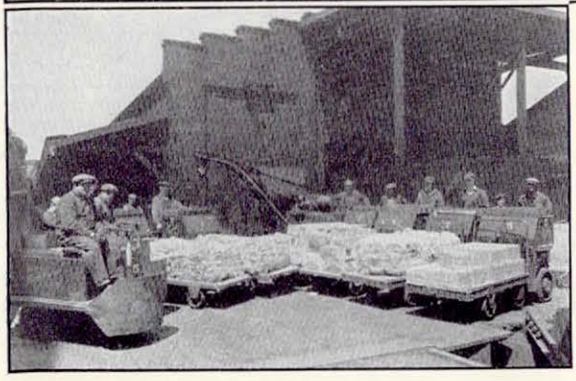












Where FLEETS *of electrics are used* *Elwell-Parkers* PREDOMINATE

FROM the Atlantic to the Pacific, as well as in many foreign countries, scores of fleets of electric industrial trucks are earning thousands of dollars annually for railroads. Many of these fleets are entirely Elwell-Parker-built—and in practically all large fleets, Elwell-Parker trucks predominate.

Elwell-Parker pioneered the electric industrial truck for railroads—and for more than twenty-five years, has been engineering electric trucks, tractors and cranes that meet railroad needs in material, freight, and baggage handling.

The purchase of one Elwell-Parker generally leads to the use of more because Elwell-Parkers are an immediately *paying* investment. For the railroad official who wants definite facts on Elwell-Parker operation, we have prepared a series of booklets especially devoted to the railroad field—use the coupon in requesting any or all that may help answer your handling needs.

THE ELWELL-PARKER ELECTRIC CO., 4250 St. Clair Ave., Cleveland

ELWELL-PARKER

DESIGNERS AND BUILDERS OF ELECTRIC INDUSTRIAL TRUCKS, TRACTORS AND CRANES FOR OVER A QUARTER CENTURY

THE ELWELL-PARKER ELECTRIC CO., *Cleveland*

Please send the following railroad bulletins that will help us in planning our budget.

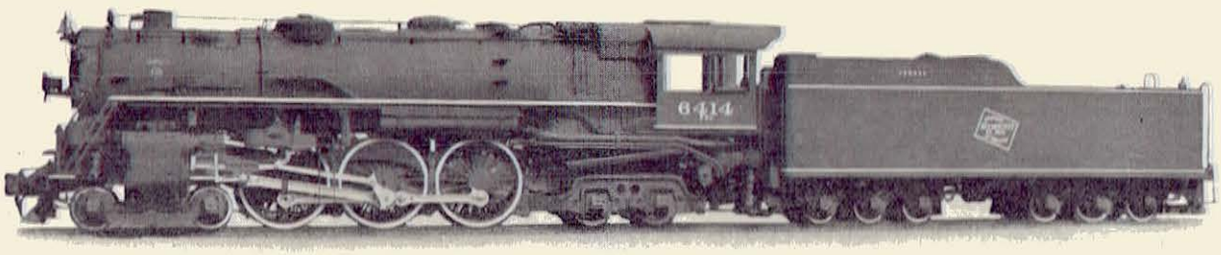
- ☐ Railroads Wise Will Motorize
- ☐ Handling and Shipping on Skids
- ☐ One Man Utility Truck for Stores Service
- ☐ Opportunities for Cost Reduction in Handling Railroad Stores
- ☐ Handling Freight at Lower Cost
- ☐ How to Speed Cargo Handling

*Railroad*_____

*Individual*_____ *Title*_____

*Address*_____

*Town*_____ *State*_____



One of the 4-6-4 Type Locomotives Recently Built for the Milwaukee Road.

Showing Confidence in the future

DIMENSIONS AND WEIGHTS	
Cylinders	26″ x 28″
Drivers, diameter	79″
Steam pressure	225 lb.
Grate area	80 sq. ft.
Water heating surface	4201 sq. ft.
Superheating surface	1815 sq. ft.
Weight on drivers	196,550 lb.
Weight, total engine	380,220 lb.
Tractive force	45,880 lb.

THE Chicago, Milwaukee, St. Paul and Pacific are placing in service eight fast passenger locomotives of the 4-6-4 type. These locomotives are closely similar to a group of fourteen built by us in 1929, which have done exceptionally fine work in handling the high class passenger trains operated by this great railroad.

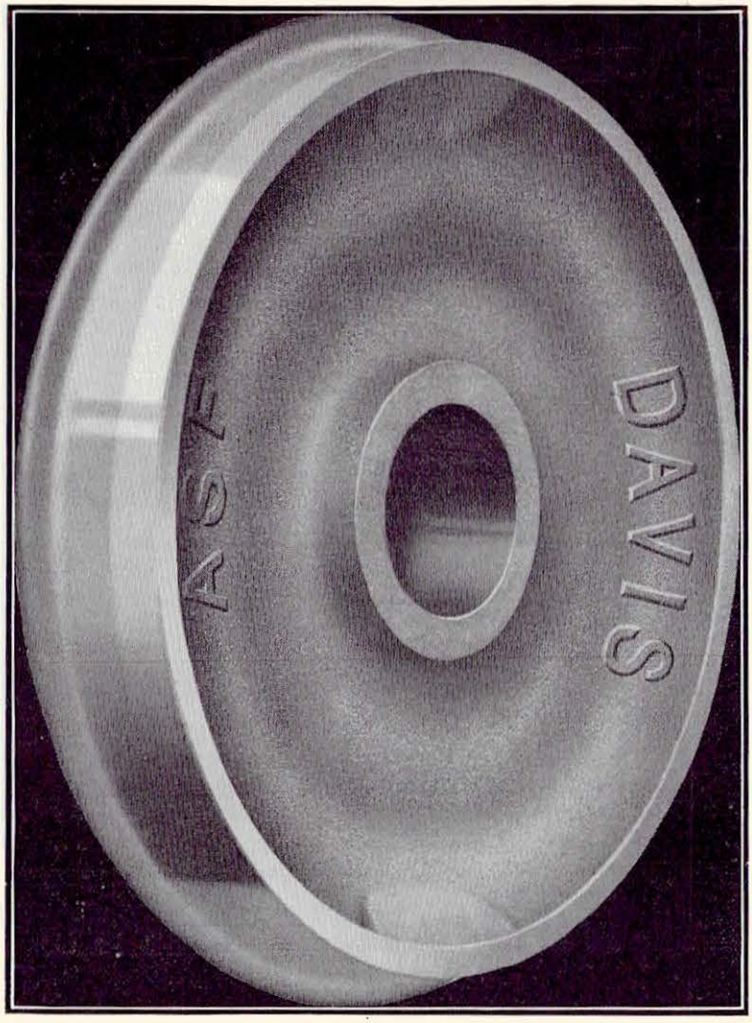
It is always true economy to replace old power with strictly modern units, specially designed for the work to be done.

It takes Modern Locomotives to make money these days!

THE BALDWIN LOCOMOTIVE WORKS 1831 1931

THE BALDWIN LOCOMOTIVE WORKS
PHILADELPHIA

DAVIS "ONE-WEAR" STEEL WHEELS



WHY PERPETUATE AVOIDABLE REPAIR WORK?

Here is an unnecessary job that grows larger every year - wheel conditioning . . . . . .

Wheels that seek the shop for re-turning occupy the time of men and machinery unnecessarily . . . . . .

Davis "One-Wear" Wheels go through life causing no trouble, only asking to be left alone . . . . . .

Their special composition steel, triple heat treated, will abolish maintenance work . . . . . .

Use Davis "One-Wear" Steel Wheels for relief from maintenance . . . . . .

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

$150,000,000—for "Safety First"

Why do railroads spend stupendous amounts of money to prevent accidents? Aside from the importance of human life, railroads know that it is cheaper to prevent accidents than to pay for them.

This is strikingly true of lubrication. Almost any cheap oil will let the wheels go around. But only a lubricant that is exactly suited to the job it has to do will prevent interrupted operations, equipment failures, repair and replacement costs, higher maintenance expense, etc.

When you specify Gargoyle Lubricants you get high grade products that are exactly suited to all the equipment you use, and the operating conditions it must face. Actual performance results on many railroads today is the proof.

Vacuum Lubrication engineers working with builders of all kinds of industrial machinery have developed Gargoyle Lubricants which give the best lubrication at the lowest cost. *This is why 81% of the builders of industrial machinery recommend and approve Gargoyle Lubricants.*

A Vacuum Oil Company representative can give you plenty of evidence that Gargoyle Lubricants are safe, efficient, and economical in all railroad operations. There is no obligation if you ask us to prove our case. Address: Railroad Department, Main Office, 61 Broadway, New York.

GARGOYLE

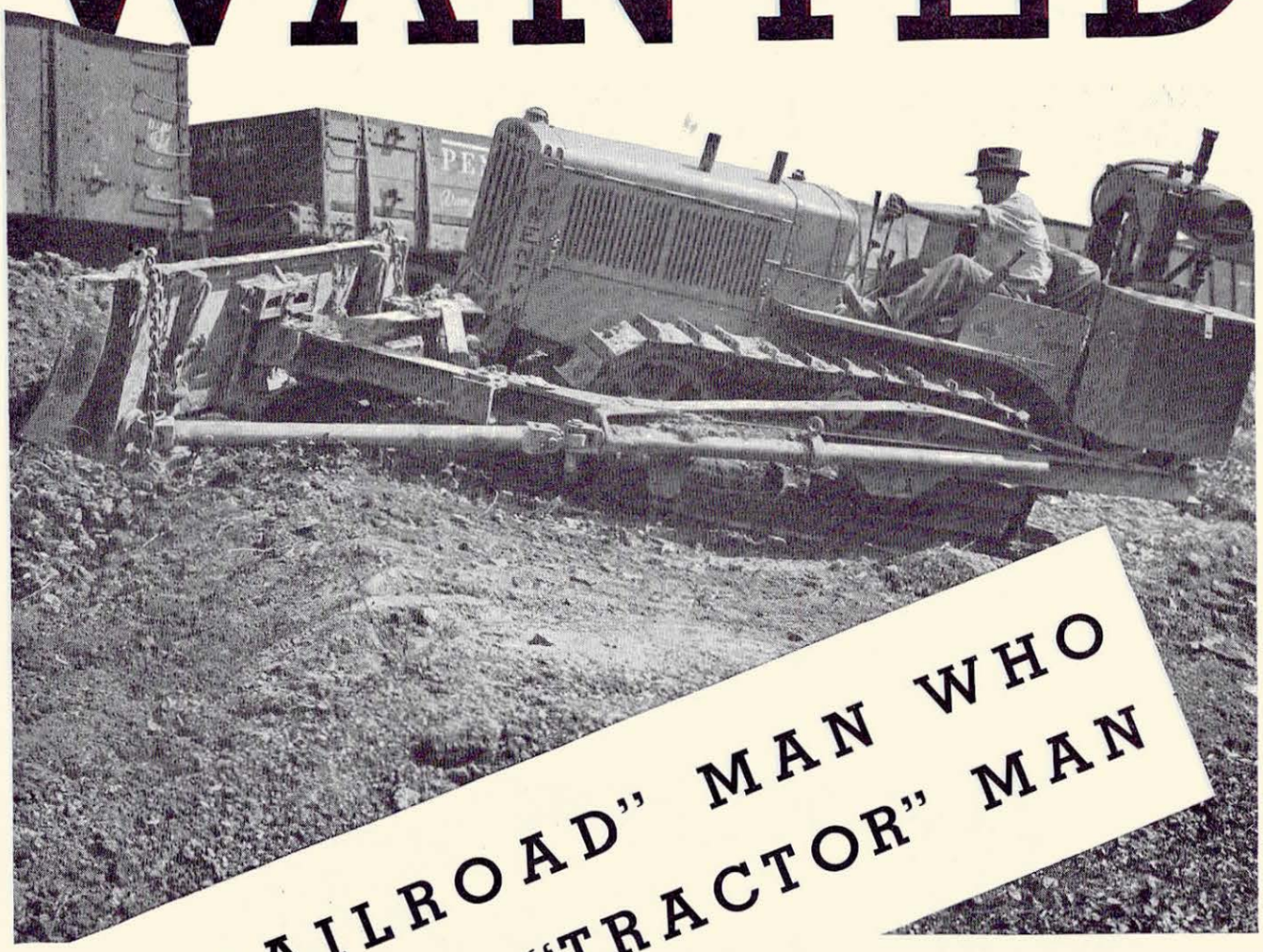
Railroad Lubricants

Stationary Steam Engines, Diesel Engine Lubrication, Air Compressor Lubrication, Bearings and Their Lubrication, Gear Lubrication, Machine Shop Lubrication.

These specialized treatises will help you secure better lubrication. We will be glad to send any of them to any railroad executive or lubrication engineer, if requested on your road's letterhead.

VACUUM OIL COMPANY, Inc.

WANTED



A "RAILROAD" MAN WHO CAN BE A "TRACTOR" MAN

WE HAVE a good job for some man with experience in a maintenance-of-way division. A man who is old enough to have acquired considerable knowledge of the railroad end of the business—and young enough to learn about track-type tractors. A man who has engineering experience—and a sales personality. A man who will thoroughly acquaint himself with the numerous ways "Caterpillar" Tractors are now saving money for many railroads—and then effectively tell that story to the right men in all the railroads. Please tell all about yourself in the first letter.

CATERPILLAR TRACTOR CO., Peoria, Illinois, U.S.A.

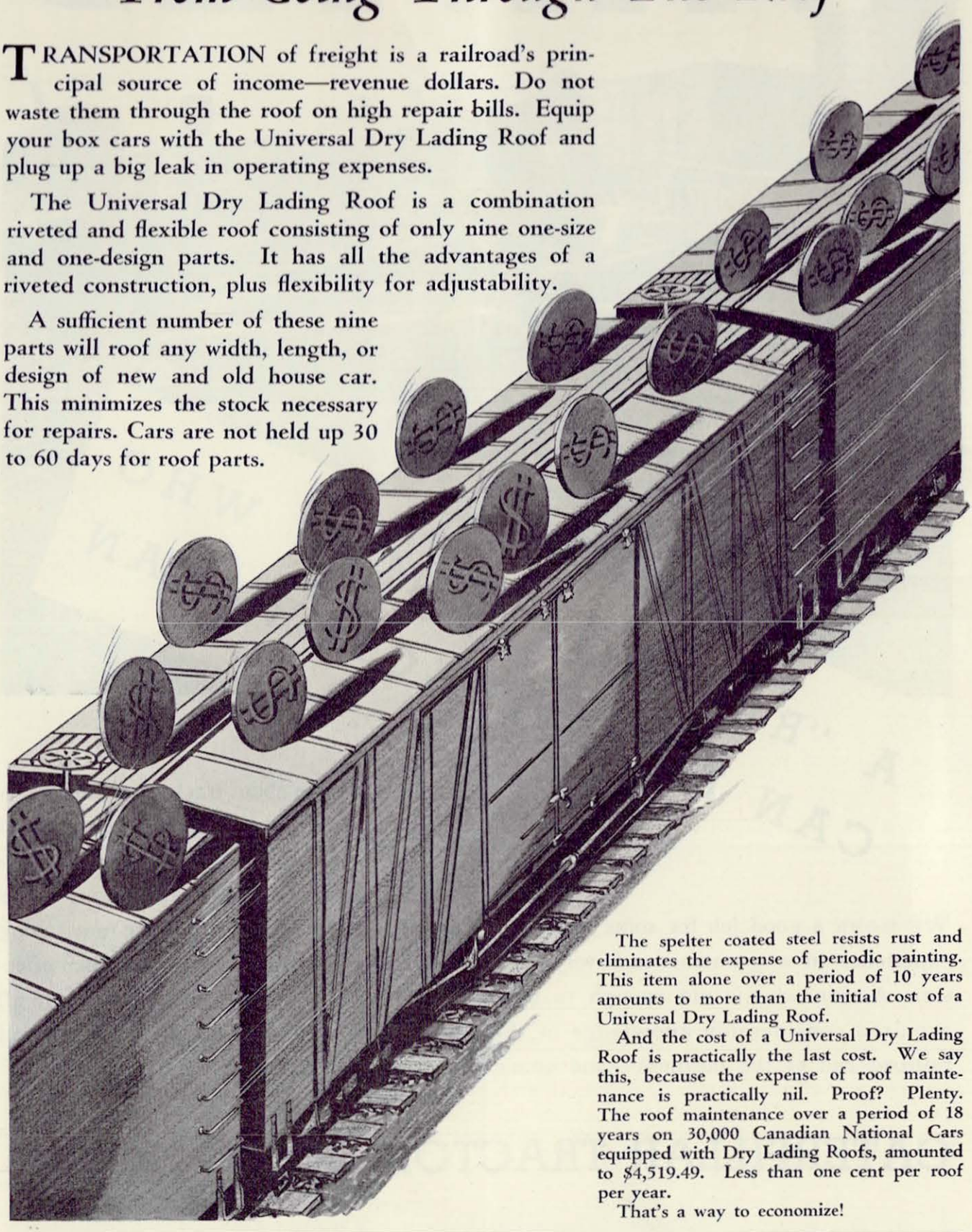
KEEP YOUR REVENUE DOLLARS

From Going Through The Roof

TRANSPORTATION of freight is a railroad's principal source of income—revenue dollars. Do not waste them through the roof on high repair bills. Equip your box cars with the Universal Dry Lading Roof and plug up a big leak in operating expenses.

The Universal Dry Lading Roof is a combination riveted and flexible roof consisting of only nine one-size and one-design parts. It has all the advantages of a riveted construction, plus flexibility for adjustability.

A sufficient number of these nine parts will roof any width, length, or design of new and old house car. This minimizes the stock necessary for repairs. Cars are not held up 30 to 60 days for roof parts.



The spelter coated steel resists rust and eliminates the expense of periodic painting. This item alone over a period of 10 years amounts to more than the initial cost of a Universal Dry Lading Roof.

And the cost of a Universal Dry Lading Roof is practically the last cost. We say this, because the expense of roof maintenance is practically nil. Proof? Plenty. The roof maintenance over a period of 18 years on 30,000 Canadian National Cars equipped with Dry Lading Roofs, amounted to $4,519.49. Less than one cent per roof per year.

That's a way to economize!

Hutchins Car Roofing Company

The Opinion in the Rate Advance Case

The developments which have occurred within the last two years in the railroad field, and which culminated in the decision of the Interstate Commerce Commission in the 15 per cent rate advance case, and the way in which that decision has been received, are strikingly typical of the reasons why the present depression has been the longest and most profound in history.

Most of our economic soothsayers said that the authorization by the commission of an adequate advance in freight rates would help business. The commission denied such an advance. Practically none of these soothsayers have criticized the decision. Pollyanna has been recalled to help Santa Claus. The commission has made a Santa Claus of the stronger roads by authorizing an advance in rates on specified commodities which would produce perhaps one-fifth as much revenues as the railways asked for and by imposing the condition that the increased revenues shall be pooled and distributed among the various railways according to their needs. The Norfolk & Western, under this plan, would take increased earnings derived by it from transporting coal from the Pocahontas field to Norfolk, and put them in a pool for the benefit of railways that are forced to haul wheat at a loss to Puget Sound.

The Views of Pollyanna

Pollyanna says that the adoption of this scheme of making a Santa Claus of the stronger roads, which was originated by Mark W. Potter in the western rate advance case a few years ago, and introduced in the recent rate hearings by attorneys for the National Industrial Traffic League, is a great economic discovery, and that its adoption will be good for business. Of course, if the railroads reject it Pollyanna will say that that is good for business, too.

The practice originated in Washington two years ago, of camouflaging every development affecting business as something that will help it, has become so universal and habitual that, but for the constant outcries for Santa Claus to save the ship, one might think that we were sailing the smooth sea of prosperity instead of still being sunk in the trough of depression.

The *Railway Age* declines to participate in the dissemination of this Pollyanna economic buncombe. It is time to quit lying about business. This paper knows as much about the railroad business as the Interstate Commerce Commission and all the Pollyannas; and in our opinion the commission's decision will be of little value to the railroads excepting as a means of clearing the air of buncombe and emphasizing the need for adopting measures which should have been adopted already. The commission's proposal to pool a small advance in rates was made to save the face of the commission, not to save the railroads. It would have been better for the railroads if they had been refused any advance in rates whatever. Then what they should do would have been plain to everybody instead of being confused as it is now.

Between Devil and Deep Sea

The commission could, however, be criticized with undue severity for refusing a large advance in rates. It found itself between the same devil and deep blue sea between which the railway executives had found themselves. In past depressions the railways, as well as other industries, reduced wages. The federal administration took a stand two years ago against wage reductions. As time has passed other industries have disregarded this, but the railroads could not because the President would appoint the board that would finally pass upon railway wages.

The railway executives knew as well as anybody that a period of low prices and depression is a bad time to advance freight rates, but they had exhausted every resource excepting that of reducing wages or advancing rates, and they sought an advance in rates as the only available means of preventing many railroad bankruptcies and the destruction of railroad credit.

The commission was confronted with the administration's wage policy, on the one hand, and general

economic conditions, on the other hand, and therefore refused the advance in rates asked with only a passing reference to the question as to whether economic conditions did not demand a reduction of wages rather than an increase of rates. In discussing the railways' application, the commission's decision and future policies affecting the railways, the circumstance should not be disregarded that both the railways and the commission were caught between two forms of regulation, one extra-legal and the other legal, and that if there had been no extra-legal government interference with wages the problem presented to both the railways and the commission would have been quite different.

Face to Face With Wage Question

Regardless of the administration's wage policy, the commission's decision has brought the railroads and their employees face to face with the wage question. The decision, whether economically sound or not, is tantamount to a declaration that either many railroads must continue to drift straight toward bankruptcy or wages must be reduced.

In August, 1931, the railways had 471,479 employees less than in August, 1929, and they must continue to reduce employment unless business soon improves or wages are soon reduced. A comparatively small reduction of wages would save them enough to stop their reduction of employment and protect their credit. Railway wages have been advanced within recent years until the average hourly wage is now the highest in history. The railways have "played the game" with their employees by maintaining wages during two years of the most severe depression ever known and by seeking an advance in rates rather than a reduction of wages. It is not their fault that a reduction of wages is now apparently essential. Reductions made because of a depression never have been permanent. Is it not possible, therefore, that labor leaders and employees may decide that it will not only be fair, but in the interest of employees themselves, for them voluntarily to accept a reduction of wages sufficient to stop further reductions of employment and the destruction of railway credit?

The Commission's opinion raises many important questions, most of which must be relegated to future discussion. The most important of these are as to the reasons for the present railway situation and as to the policies that should be adopted to enable the railways to pass through the present depression and to prevent similar crises in future. The principal grounds upon which the commission denied an advance in rates were, first, that it would do the railways no good, because it would divert or destroy traffic and, secondly, that it would be economically unsound in a period of depression principally because commodity prices are now relatively low as compared with railway rates.

Whether the eleven members of the commission, with the very limited experience of most of them in transportation and other large affairs, are more competent to decide what is good for the railways than all their chief executives combined, seems open to some question. An appointment to the commission, or even some years service upon it, does not necessarily make a man a great transportation expert. At least the members of the commission have not shown unbecoming modesty.

Freight Rates and Commodity Prices

The commission's contention that it would be economically unsound to advance railway rates because of present low commodity prices is an indictment of the intelligence and fairness of its policy of regulation of rates for twenty-five years. Obviously if commodity prices should be used as a measure of what railway rates ought to be when prices are low they should also be so used when prices are high. Effective federal regulation of rates began in 1906. Let us take average revenue per ton mile and average wholesale prices of commodities during the five years ending with 1905 as bases and see what the commission's policy actually has been.

In the five year period 1906-1910, inclusive, the average railway rate was 1 per cent less than in the preceding five years, while wholesale prices of all commodities were 12 per cent higher and prices of farm products 16 per cent higher. The railways sought a general advance of rates in 1910, and used the advances in wages and commodity prices that were occurring as an argument for it, but the commission refused it.

In 1917 average revenue per ton mile was 5 per cent lower than in the five year period 1901-1905, but when in that year the eastern lines sought a 15 per cent advance in freight rates the commission granted them only half of it, although the average wholesale price of commodities was 100 per cent higher than in 1901-1905 and the average price of farm products 129 per cent higher. At the end of 1917 the commission "threw up the sponge" and plunged the railways into government operation by sending a letter to Congress saying that it could not deal with the railroad emergency created by advancing wages and prices.

In the three years 1920-1922, inclusive, railway freight rates averaged 55 per cent higher than in 1901-1905, all wholesale commodity prices 98 per cent higher, and prices of farm products 97 per cent higher, and yet in 1922 the commission ordered a 10 per cent general reduction of rates principally upon the ground that owing to depression and low prices a reduction of rates was needed to revive business.

What Railway Earnings Might Have Been

During the seven years 1923-1929, inclusive, railway freight rates averaged 45 per cent higher than in 1901-1905, all wholesale commodity prices 68 per cent higher, and prices of farm products 82 per cent higher. During this period the railways failed in every year

to earn a fair return upon the commission's own valuation. If freight rates during this period had been as high, compared with commodity prices, as in 1901-1905, they would have averaged 16 per cent higher than they did, and the railways would have derived an average of $750,000,000 a year more earnings from their freight business than they did, and, instead of seeking an advance in their rates in the midst of the depression, could have stood a reduction of them. Rates only about 10 per cent higher than those in effect during 1923-1929, inclusive, would have enabled the railways during this period to have earned an average of 5¾ per cent on their property investment, and rates only 6¾ per cent higher would have enabled them to have earned an average of 5¾ per cent upon the commission's own valuation. Even in 1930 the average railway rate was only 39 per cent higher than in 1901-1905, while the average of all commodity prices was 47 per cent higher, and the average of farm products prices 57 per cent higher.

Why did it never occur to the commission between 1922 and 1931 that the level of freight rates should, in such large measure, be determined by the level of commodity prices? If the commission had applied the same rule when it would have worked favorably to the railways there never would have been a railroad problem at any time during the entire twenty-five years of effective federal regulation. For a body that pretends to be fair the commission is remarkably consistent in so applying rules and principles that they will work to the disadvantage of the railways.

The Impeccability of the Commission

The decision plainly implies that everybody has been out of step during the last decade excepting the commission. The railways have not maintained rates as they should have. They have not cooperated in effecting economies as they should have. Competition with them fostered by subsidizing without regulating other means of transportation has diverted traffic from them. All of which is true. But never has the commission made a single mistake or committed an unfairness. If so, that mistake or unfairness is not even vaguely alluded to in the opinion. Such omniscience and impeccability in a body of changing membership, composed of men usually selected without any regard to their previous experience in transportation affairs, and subject to the influence of Washington exceeds human belief.

It remains true, nevertheless, that the commission was given great power by the Transportation Act, and instructed to so exercise it as to help the railways to earn a fair annual return, and that throughout a period of eleven years the railways have never earned that return in a single year and at the end of the period are confronting financial disaster. How the commission, in view of this record, can so plainly imply that it has no responsibility whatever for past or present railway earnings would be difficult to understand. If the commission had done its own duty, instead of resorting to every possible fallacy and subterfuge to avoid doing it, and to "pass the buck" to others, the present railway situation would not exist. Upon it rests the major responsibility for that situation, and if a large number of railways become bankrupt and railroad credit is destroyed, the commission should be held principally responsible for it.

Recommendations Instead of Revenues

While the commission has been rather poor at performing its own duty, it is good at telling others how to do theirs. Responsibility is burdensome, duty is irksome, but advice is cheap. The commission repeats the recommendation already made by it to Congress that new provisions shall be substituted for the rate making provisions of the Transportation Act. Its proposal that the recapture provisions shall be repealed should be adopted, if for no reason excepting that the commission has in the past so regulated rates that while the earnings of some railways have been made subject to recapture the railways as a whole have never been allowed to earn the fair return upon which the policy of recapturing part of the earnings of the stronger roads was predicated. The rest of its proposed rate making legislation would give the commission the arbitrary power to fix rate bases instead of lawful valuations and to "endeavor to adjust the general level of rates so that operating carriers as a whole will under normal conditions" earn a fair return. Why should it be expected that the commission would administer the legislation it proposes any more favorably to the railways than it has the legislation more favorable to the railways which it now proposes shall be repealed? It also suggests "a provision that some portion of surplus accumulations shall be held in liquid form" instead of being invested in property. As it says current experience shows "no matter how large such accumulations may be * * * they may be of comparatively little use in meeting immediate deficiencies in earnings, if they are invested in railroad property as they normally are." Unquestionably current experience is showing that in years of prosperity the railways should, if they have opportunity, build up larger liquid reserves for periods of depression, but obviously the amount of such reserves that they can build up will depend upon the amount of net operating income the commission allows to be earned.

Policies for Congress, Legislatures and Railways

The commission makes some important and constructive suggestions regarding policies which should be adopted by the national and state governments in dealing with competing means of transportation and by the railways themselves in cooperation to promote their common interests. "Such taxation of trucks and buses as may be necessary to impose upon them a fair share of the burden of the public highways which they use" and "such regulation of their rates and service as the public interests may require" are mentioned, and it is significantly added that "what we have said

as to the trucks and buses applies also to the waterways." Alterations that the railways are forced to make in their properties for public purposes, such as the elimination of highway grade crossings, are referred to, and it is said that to the extent that expenditure for such purposes "is caused by other than railroad needs and does not increase the traffic of the railroads or save them expense, it may be that this burden should justly be shifted from the shoulders of railroad users."

"So far as rates are concerned, it is clear that the present structure has developed under principles and theories which gave no thought to the competitive agencies of transportation which now exist," and "it is evident that radical changes in service and rates must be made * * * to meet new competitive conditions and make it necessary, also, for the railroads to cooperate more efficiently with each other and reduce the waste in service and in rates which has marked their own competition." "The railroads now furnish the backbone and most of the other vital bones of the transportation system of the country and we believe this will be the situation for a long time to come."

But How About the Commission's Policies?

All that the commission says regarding these matters is obviously true, and the suggestions it makes are constructive and sound, but all the same facts have been presented and the same suggestions made by other authorities on railway affairs for years. The national and state governments have the duty of changing present transportation policies which unfairly discriminate against the railways in favor of other means of transportation. Railway managements have the duty of cooperating better to promote the interests of the railroad industry as a whole. But the commission also has responsibilities and duties which it has disregarded, in spite of the skill with which it tries to "pass the buck," and all of it, to others for the present railway situation. While the commission is telling other agencies and persons so well what they ought to do one would like to have some light on what changes it intends to make in its own policies. That is the one point which only the commission can illuminate; and it is the one point on which the opinion throws no light.

The 15 per cent rate advance case and the commission's opinion in it probably will prove to be epochal in railroad history. The making of the application for a general advance in rates in a period of depression, and the commission's opinion in the case, constitute the most powerful indictment of federal railway regulation ever written. The commission's past policy, and the administration's interference with the freedom of action of railway managements as regards wages, made necessary the application for an advance in rates, and, together with the commission's opinion in the case, constitute an unanswerable argument for a great reduction in government interference with railroad management and operation.

Government regulation broke down in the emergency of the war. It has broken down again in the emergency of the present depression. The commission's opinion shows that it understands the present situation, but shows no understanding of the influence exerted by itself in creating this situation or recognition of the fact that its own policies must be radically altered if the railroad problem is to be solved under private ownership.

Perhaps this is not surprising in view of the fact that the opinion shows plainly that it was written principally by an advocate of government ownership, and that this advocate of government ownership now dominates the commission even more completely than he ever did before. Probably the real question with which the nation is confronted is—more railroad freedom, or government ownership? The answer will be the latter unless railway regulation is much less influenced in future than it has been during the last decade by government ownership views and the poisonous and stupefying political atmosphere of Washington.

Drainage Pays

No analysis of the physical condition of the railway tracks after two years of curtailed maintenance expenditures is complete unless due consideration is given to the deficiency in rainfall that prevailed in many areas throughout much of that period. In other words, the reduction in expenditures for surfacing was offset in part by the decreased deterioration of the roadbed resulting from the subnormal amount of water in the subgrade. But this does not tell the entire story, for one of the outstanding advances in maintenance of way practices of the last decade has been a marked increase in attention to drainage.

This has not been due to the discovery of any new facts concerning the behaviour of wet roadbeds or the causes of water pockets, but must be explained by the development of more direct and less expensive means of improving the drainage. Modern equipment for ditching makes it possible to secure the benefits of deeper ditches and wider cuts at a much smaller outlay, and the newer facilities for obtaining subsurface drainage have demonstrated their effectiveness under a wide range of conditions. The result was to give a marked impetus to drainage projects which resulted in an improvement in track conditions, the value of which is probably not fully realized even now.

In these days, when expenditures must be confined to essentials and each dollar must pay the maximum return, the possibilities of better drainage should not be overlooked.

The Dragline Bucket, Shovel Dipper and Clamshell
as Applied to Modern Crawler-Tread Machines

Operating Economy Series — Article No. 17

Save Money in Handling Material

Modern machines for the construction and maintenance of tracks and bridges offer opportunities for many economies

THERE are few operations in which men are employed merely in the lifting or moving of materials that cannot be done cheaper by machinery. Almost the only limitation that must be placed on this statement concerns those items of work in which the quantity of material or its distribution is such that a machine cannot turn out a sufficient volume of work to "earn its keep." But even in cases where conditions are judged unfavorable for the effective use of power equipment, it is not infrequently possible to so alter the arrangement of the work as to remove the obstacles to its use.

As a matter of fact, the use of mechanical equipment in handling materials has reached the stage where obvious applications are standard practice, and further mechanization depends largely on the ingenuity and initiative applied in searching out those fields of usefulness that have been overlooked because certain conditions requisite for the successful use of the machine have not conformed with established routine.

Improvements in Power Shovels

This does not mean that the work must always be adjusted to fit the requirements of the machine. On the contrary, more has been done to adapt the machine to the work than is generally realized. Take the power shovel, as an example. The railroad-type steam shovel was a pioneer material handling machine and, as its name indicates, is essentially a railway construction utility that has saved millions of dollars in the building of our vast network of lines. But it has severe limitations; its mobility is restricted, it must work from a track, it is too large for some kinds of work, the conventional dipper is not suited to all types of excavation and bulk material handling, and it usually requires a bulky fuel that can be delivered long distances over poor roads only at excessive expense. In view of these limitations, what have been the results?

Thanks to developments starting from the steam shovel as the basic idea, power excavating machines are now available that meet almost every conceivable requirement and that embrace features that overcome practically every limitation of the original machine. Crawler, truck and other mountings that permit of travel independent of rails, and improvements in the travel drive, together with turntable-mounted bodies, afford greater mobility and opportunity for greater diversification of sizes; while the application of gasoline, Diesel and electric power plants and a thorough-going refinement of machinery, frame and cab have effected a virtual revolution in appliances of this class. Not only are machines available for each individual type of work, but the work can be done cheaper and better—one man, for example, is all that is necessary for the operation of many of these shovels whereas the old steam shovel required a fireman, an operator and a craneman, in addition to four or more pit men. Of equal importance is the convertibility of many of these machines, which affords in one unit not only a power shovel, but also a dragline excavator and a crane which may be used with a clamshell bucket, a hook or a magnet.

The Locomotive Crane

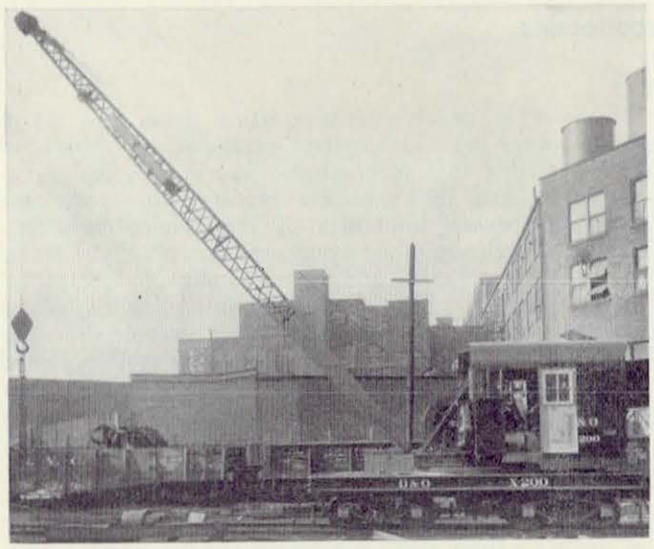
This does not imply that flanged-wheel equipment has outlived its usefulness, for corresponding progress has been made in the improvement and application of the locomotive crane, which is now available with gasoline and Diesel as well as steam engines and in a range of capacities to suit all needs. Locomotive cranes of large capacity equipped with long booms have supplanted the bridge derrick car for nearly all work except the erection of long girders and especially large and heavy truss members, and when provided with leads are used effectively as pile drivers. An important modification of the locomotive crane is the small self-propelled crane designed especially for rail-laying and

adapted also to the handling of loads encountered in pile trestle renewals.

Modern Machines Replace Older Types

Machines of these various types have effected marked economies in roadway construction and maintenance work and will produce further savings as their use is extended. These savings result in part from a reduction in the amount of labor required, although in most cases it is unfair to compare the output or cost of machine operation with the equivalent cost of hand labor, since much of the work done is of a character that is rarely performed manually in these days. Rather the comparison should be between the performance of these machines with the older equipment that they are superseding. They show economies by reason of the elimination of work-train service, decreased interference with train movements, economy in fuel, increased mobility, and faster and easier operation.

As an indication of the extent to which equipment of this character is being employed by some roads, reference may be made to the Pennsylvania which has about 100 of the smaller crawler-type convertible machines engaged in a variety of operations that were formerly conducted with hand labor or other machines. This work includes such items as the widening of cuts, "deep" ditching, excavating surface ditches, cleaning tracks and other operations in which machines of this type are of



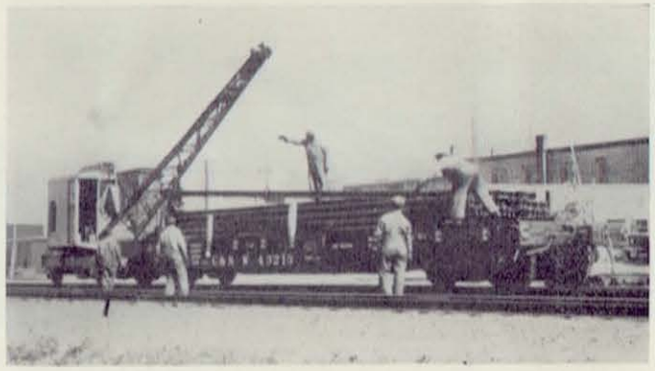
The Locomotive Crane is Applicable to a Variety of Service Requirements

particular advantage by reason of the fact that they do not occupy tracks. They are also used on flat cars in work-train service for picking up rails, refuse, etc.

On the Rock Island machines of this type, together with locomotive cranes and ditchers, were employed in depressing two main tracks in a recent grade revision project in Illinois. One crane took up the rails, ties and ballast of one track and deposited them on the shoulder of the other track, a crawler-type shovel then excavated the roadway to the new grade, casting the spoil against the side of the cut, a second locomotive crane replaced the track, and a battery of two ditchers loaded the spoil cast against the cut slope, widened the cut and excavated the ditch to the required depth.

Ballast Pit Operation

Another field for effecting economy through the use of modern excavating equipment is in the operation of



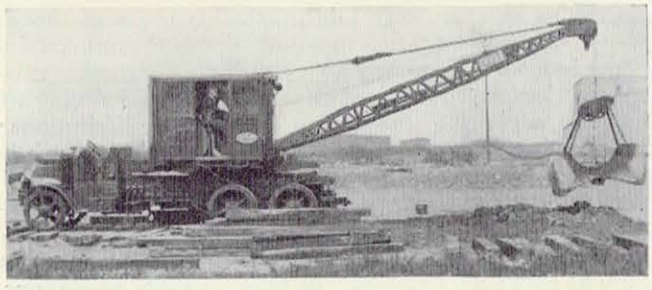
An Example of the Small Self-Propelled Cranes Now Employed in Rail Laying and Handling, Bridge Work, etc.

ballast pits. Instead of the conventional railroad-mounted steam shovel which requires a pit crew and a spotting locomotive, such a pit can now be operated with a modern caterpillar-mounted shovel and a crew of but two or three men, since these shovels require no pit men and the machine moves alongside the loading track as it fills the cars that have been set in by road crews. On the Great Northern a 70-ton oil-fired steam shovel with a force consisting of an operator, a fireman and a helper loaded an average of 1,500 cu. yd. of pit-run ballast in a day with a consumption of 250 gal. of oil and 400 gal. of water.

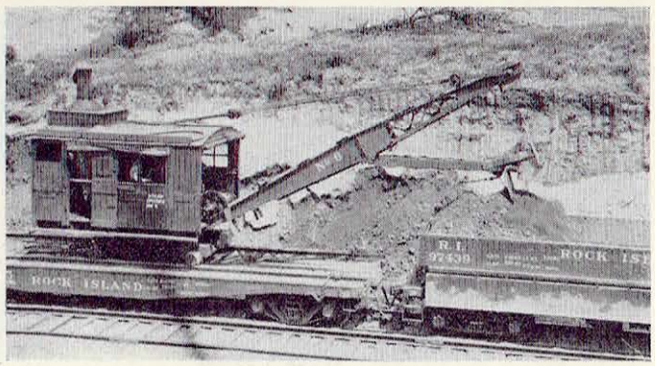
The usefulness of the power crane has been greatly extended by the perfection of digging and material-handling buckets of the clamshell type. In bridge and building work, for example, such equipment has been employed to excavate for the foundation, load spoil, fill the aggregate bin over the mixer, place falsework and, if of the locomotive type, to move cars. The fact that a small rail-mounted crane effected a saving of $27.12 in replacing the stringers of an eight-panel open-deck trestle demonstrates the opportunity for economy in the conduct of work of this character.

In cleaning ballast, the locomotive crane has found a definite place in connection with stationary or vibrating screens mounted on cars. According to A. R. E. A. investigations that were reported on in 1927 and 1929, respectively, ballast can be cleaned with such outfits at a cost ranging from $621 to $1617 per mile, compared with $2130 to $3219 per mile for hand forking.

Ballast cleaning can also be done at a marked saving with a machine which forces its way through the ballast on the shoulders or in the intertrack space without fouling the clearance limits of passing trains. Records based on the performance of 149 of these machines show costs ranging from 3.4 cents to 9 cents per cu. yd. of ballast handled, as compared with about 28 cents for hand forking. Considerable progress has been made also with more elaborate equipment designed to plow up the ballast, remove it from the roadway by means of



A Truck-Mounted Crane



The Ditcher and the Air Dump Car Have an Important Place in Roadway Maintenance

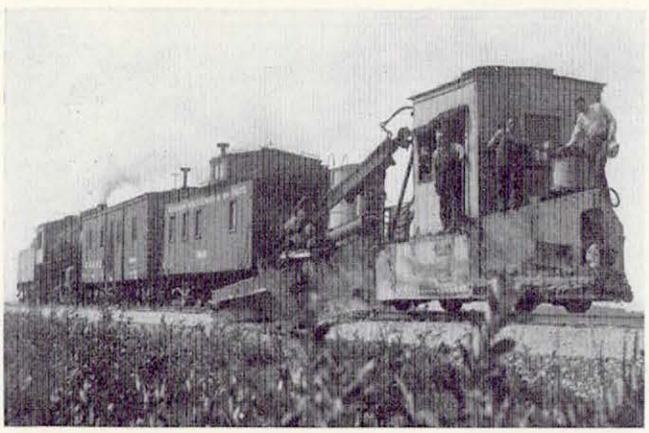
clamshell buckets and pass it over a series of agitating screens so arranged that the foreign matter is deposited in cars and the cleaned ballast is dropped back on the roadbed.

Rail Laying

One of the largest opportunities for saving money with locomotive cranes and small self-propelled cranes is presented in rail renewal work, as discussed briefly in Article No. 11 of this series, which was published in the *Railway Age* of September 19, page 428. Data compiled by the Committee on Economics of Railway Labor of the A. R. E. A. indicating the influence of the power handling of rails exclusive of other equipment used by the gangs, show savings of $44.28 to $58.59 per mile. The reason is obvious—rails can be set in place by a crane with a force of 3 to 6 men, whereas 16 to 26 men are required to set rails with tongs. The use of power hoisting equipment in unloading or loading rail has become so general that comparisons with manual handling are beside the point; the object today is to select the type of equipment that saves the most money and requires the least work-train time. Beside locomotive cranes, some roads are now using crawler tread cranes in drop-end gondola cars for this service.

Ditchers

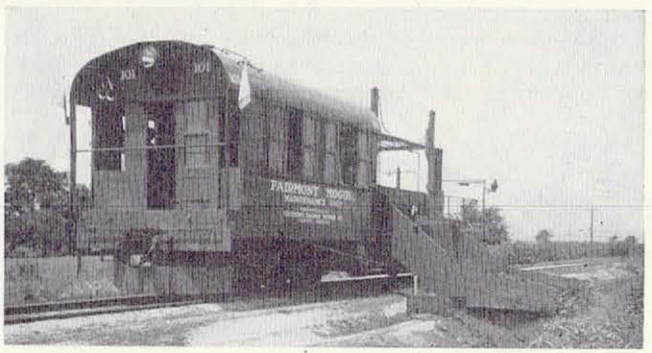
The economy of using power equipment for ditching is so thoroughly established that comparisons with manual ditch digging are meaningless. The only questions that arise today concern the extent to which railways will avail themselves of the low cost of power ditching to gain the benefit of better drainage, and determination of the type of equipment that is to be used.



Machines of this Type are Used as Spreaders, Ditchers, Ballast Shapers and Snow Plows

The choice lies primarily between the spreader-type ditcher and the shovel-type machine designed for operation on top of a flat car or on the track (locomotive ditcher). Each has its advantages under particular local conditions. In connection with the shovel type, attention is directed to the economy of the use of two or more machines in tandem formation since the work train charge is thus reduced in proportion to the number of machines employed. When ditching entails the widening of cuts, the work of the ditching machines can be supplemented in some cases by a dragline excavator working from the top of the slope.

The spreader type ditcher has also become increasingly important in ballasting operations, being used for shaping the roadbed and breaking down the ballast shoulder in advance of and after cribbing, for distributing the ballast for the final dressing of the track, and for the final shaping of the ballast and roadbed shoulders. By conducting the work with two gangs employed within 15 or 20 miles of each other, one machine will readily serve both gangs. It is of interest to note that a new ditcher-ballast shaper has recently been intro-



A New Self-Propelled Ditcher and Ballast Shaper

duced which is equipped with its own power plant for propulsion, thus dispensing with the services of a locomotive.

Special Service Cars

No discussion of equipment for handling materials is complete without reference to cars employed in material-handling service. In so far as it is practicable and economical, cars normally in revenue service are employed and in some cases this can be done with particular advantage where company material is hauled in the normal direction of empty movement. But this practice can be overdone because the saving in cars may be far outweighed by the cost of unloading, when compared with the greater economy of handling material in cars designed especially for the purpose. In disposing of cinders, for example, the use of self-clearing side-dump cars on one road resulted in a saving of $11.73 per car compared with the use of gondolas in the return movement to coal mines, taking into account the charges for the equipment in each case and the saving in the labor of unloading the gondolas.

Cars of this type are indispensable in such service as ditching. Not only is the unloading done at a smaller expense for labor than with any other type of car, but it is also done much quicker, thereby reducing the time that the work of the ditchers is interrupted. In addition, modern cars with drop doors release the load at a sufficient distance from the rail to avoid fouling the ballast.

Similarly, data compiled by the Committee on Economics of Railway Labor and reported in 1927 point to

An Application of the Tractor in Railway Work

the economy of employing cars of suitable design in ballast service. Modern cars, constructed to give almost any desired distribution of ballast although also convertible for use in revenue service, permit of marked savings in unloading. Thus, according to the report cited above, ballast cars were unloaded by a foreman and two men in the same time that a foreman and eight men were engaged in unloading drop bottom gondolas. Expressed in terms of the labor required per mile, the figures were 37 man-hours for ballast cars, 63 man-hours for hopper cars and 335 hours for gondolas.

Tractors

One of the latest developments in material handling equipment in roadway work that offers much of promise is the use of the crawler-tread tractor for the motive power for a wide variety of operations. It can be used with excavating graders, plows and scrapers for making cuts, forming ditches, etc.; with slips for cleaning out culverts; with carts or wagons for handling spoil from excavations; and with push plows or rotary brooms for removing snow from platforms, drive-ways, etc. Equipped with a boom and hoist, it can be used for laying rail and for handling frogs and switches, and when equipped with a water pump or an air compressor it provides an unusually mobile power unit.

On a culvert-cleaning job the cost, using a tractor, was $9.60 per cu. yd. less than the cost on previous occasions when the work had been done by other means. A tractor equipped with a boom and hoist salvaged track material from an abandoned line at an estimated saving of 50 per cent, while the use of a machine in stringing line wires is said to have effected a saving of $68 per day.

Track Motor Cars

The track motor car is an important agency for economy in maintenance of way and structures because of the time that is saved in moving gangs of workmen to and from their work. According to C. R. Knowles in his articles on the Care and Operation of Track Motor Cars, published serially in Railway Engineering and Maintenance during 1930-31, a car used in track or bridge-gang service under proper administration will effect a net annual saving of $420, after deducting all charges. Even greater savings accrue from the use of cars in other classes of service, but these are not so large in the aggregate because the number of cars involved is smaller.

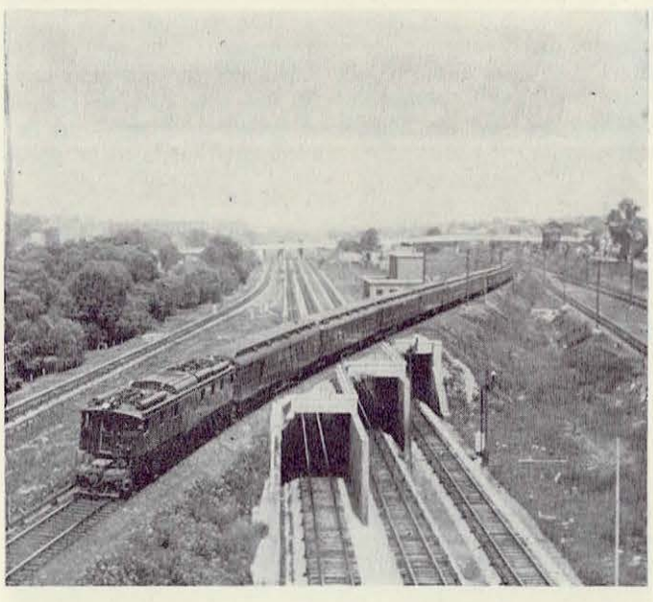
However, the use of motor cars for the transportation of forces is now so well developed that, in general, it is necessary to look to other uses for further economies. The principal opportunity lies in their greater application in handling materials on trailers. The Roadmasters' Association has pointed to the savings in work-train service that can be realized by their use in distributing ties and other track materials. Another field that is still largely undeveloped is its use as an officer's inspection car as a substitute for the business car. The newer cars for this purpose provide seating space for parties of considerable size, and afford speed, comfort and safety at a considerable saving compared with the passenger-train type of car.

Power shovels, cranes, draglines, ditchers, spreaders, ballast shapers, ballast cleaners, ballast cars, side-dump cars, tractors, motor cars and trailers comprise a formidable list of appliances, all of which have a place in the program for lower costs of track and bridge work. But the list becomes much more impressive when it is realized that nearly every item embraces varieties in size, make, type of power, etc., that permit the exercise of discrimination in choosing the appliance for the particular job. Some of these machines are exclusively for railway use, others have extended application in other fields, but all have demonstrated their adaptability to railway operations.

In Next Week's Issue

During the past ten years the steam railroads have faced an increasingly acute problem as the result of the necessity for maintaining passenger-train service in cases where the decline of travel by rail has made this service unprofitable. The modern rail motor car which has rapidly evolved during this period is proving an effective means of reducing losses or of turning losses into profits where such conditions are encountered. The article in this series which will appear in next week's issue will tell how the substitution of rail motor cars for steam trains is effecting large savings in operating expenses—savings which pay a big return on the capital investment in the rail motor cars.

* * *



The New York, New Haven & Hartford's "Bay State Express" Entering the Direct Current Zone on the New York Central near Woodlawn, N. Y.

Passenger Men Favor National Advertising Program

Annual meeting at Chicago also discusses effects of competitive and co-ordinated air lines

A PROGRAM of national advertising to stimulate railway passenger business was favored by the committee on National Publicity, of which D. M. Bowman, passenger traffic manager of the lines west of Buffalo of the New York Central, was chairman, at the annual meeting of the American Association of Passenger Traffic Officers at Chicago on October 20-21, over which C. H. Mathews, Jr., general traffic manager of the Pennsylvania, presided. Upon the recommendation of the convention, the committee drafted a resolution to be sent to railway executives, seeking the formulation of such a program. The recommendation was made following a discussion of the effectiveness of joint advertising by certain railroads, the advertising of steamship companies which has caused an exodus to foreign countries, and the type of advertising used by motor coach companies. It was thought that the present generation is not railroad-minded and that effective advertising will impress younger people with the importance of railroad transportation. As an adjunct to advertising, it was felt that railroads should pay more attention to the comfort of passengers. One railroad reported that it is continually training its employees to be courteous and, as a result, has created considerable good-will among patrons. A brakeman on this railroad was recently disqualified for further passenger service because he failed to help a man who was endeavoring to transport seven pieces of baggage from an automobile to a train.

Officers elected for the ensuing year are as follows: President, A. D. Bell, assistant passenger traffic manager of the Missouri Pacific lines in Texas and Louisiana; vice-president, A. J. Dickinson, passenger traffic manager of the Great Northern; and secretary-treasurer, W. C. Hope, re-elected.

Air Lines Becoming Competitors

The discussion of commercial aviation development reflected the feeling that this form of transportation is gradually becoming competitive with rail transportation and that the problem now facing the railroads is whether aviation should be competitive or co-ordinated. In a report of the Committee on Commercial Aviation Developments, C. E. McCullough, passenger traffic manager of the Pennsylvania, outlined the expansion of the aviation industry. Municipal airports, he said, increased from 368 in 1928 to 453 in 1929, and 555 in 1930, while private airports increased from 365 in 1928 to 495 in 1929 and 563 in 1930. The investment in 1,118 airports on January 1, 1931 totaled $115,068,000. This expansion of facilities was accompanied by an increase in the number of passengers and the amount of mail and express carried. In 1928, 49,713 passengers were carried on established lines and this number increased to 173,405 in 1929 and to 417,505 in 1930. The mail carried amounted to 4,063,173 lb. in 1928, 7,772,014 lb. in 1929 and 8,324,255 lb. in 1930. Express carried totaled 1,866,879 lb. in 1929 and 2,869,255 lb. in 1930.

The growing popularity of air travel, he said, is also reflected in the fact that in 1930, 36,945,208 air-miles were flown, as compared with 10,673,450 miles in 1928, an increase of 246 per cent. As factors in the importance of air line competition, he called attention to the fact that in 1930 there were only 9 fatal accidents and in these, only 22 passengers, five pilots and 1 co-pilot were killed, although over 400,000 passengers were carried.

During the discussion of this subject, the magnitude of air line competition was further emphasized. It was shown that fares varied from 4.5 cents to 10 cents per mile, the average being 7.5 cents and that it is likely that, with increased carrying capacity and economical operation, fares can be reduced in the future. Attention was also called to the fact that the cruising speed of planes has increased from less than 100 miles an hour to 160 miles per hour in some cases. Interline tickets now make it possible for passengers to travel over several lines and passengers are offered such conveniences as scrip and baggage checking.

Some carriers had experienced a falling off of co-ordinated air service because of improvements in air transportation. One railroad representative expressed the opinion that his railroad did not secure traffic as a results of co-ordinated air service, but had given much business to the air lines. It was the general opinion that commercial aviation has continued to grow in spite of the depression because it is more stabilized and that, with the return of prosperity, it will operate more efficiently and take more business from the railroads. It was felt that to check the loss of passengers to air service, two courses were open—participation on the part of the railroads in air service, and regulation. Regulation was cited as the most effective means at present and it was felt that it should govern rates, labor, taxes, etc.

The report of the Standing Committee on Motor Coach Service and Competition was presented by E. D. Osterhout, passenger traffic manager of the Reading. The discussion centered about the development of this form of transport and practices in competition for long distance travel, suggestions on meeting this competition, experiences of lines in the operation of highway motor service to protect and control traffic and to supplant steam service and changes in national and state motor bus legislation that have been made in the past year, both in state laws and in proposed national legislation. Mr. Osterhout called attention to the growing importance of motor coach competition, offering as evidence the fact that of the 359 transportation trips made per day between New York and Philadelphia, 71 were made by trains, while 188 were made by motor coaches

and 30 by airplanes. The advertising of railroad service done by rail carriers in Philadelphia, he continued, amounts to one-half of that done by motor coach interests. That used by operators of air service is equivalent to that of the railroads. The advertising copy of railroads deals with specific excursions, new trains, etc., while that of motor coaches deals with regular business. He suggested that it might be advisable to follow the practices of motor coach and air interests.

P. J. Neff, assistant vice-president of the Missouri-Pacific, contended that motor coaches secure business because of lower fares, but when the railways cut their fares the loss in revenue is so great that the increased business does not compensate for the loss. He pictured St. Louis, where 250 bus agents are located, calling attention to the fact that each agent is paid a 10 per cent commission on the sale of motor coach tickets, and suggested that the railroads "get on the sidewalk" in the same manner as do the motor coach agents. He recommended the stabilization of rates of both motor coaches and railroads, and railroad ownership of motor coach lines. Although the motor coach lines operated by his railroad have not made money, the company has realized 30 per cent on the investment when the discontinued train miles resulting from the substitution of motor coach service are considered.

Other discussion favored further regulation of motor coaches, particularly federal legislation. A rate differential that would establish a fixed amount for the difference between rail and motor coach fares was also recommended.

A discussion of the developments and improvements in passenger train service and equipment revealed the desirability of faster schedules to meet the public demand for speed and to offset airplane and individual automobile competition. Several cases were cited where passenger business was held by shortening the schedules of trains between certain points. One example was cited wherein a railroad cut the time of a train from 15 hrs. to 10 hr. and 5 min., with 12 stops, and as a result more than doubled the earnings of the train per mile.

The air conditioning and temperature control of cars and trains has been accepted by the public most favorably and, it is believed, will react favorably for the railroads in motor coach competition. H. B. Faroat, general passenger agent of the Baltimore & Ohio, described the air-cooled cars of that railroad. In a test, the temperature of a car which was heated to 93 deg. by steam pipes and other devices, was reduced to 73 deg. in 20 minutes, the rate of reduction being 1 deg. per minute. Among the advantages of air-cooled cars he included the lessening of fatigue and noise and relief from hay fever.

L. M. Allen, vice-president and passenger traffic manager of the Chicago, Rock Island & Pacific, spoke on rail motor-car operation, emphasizing the development in types of equipment and the effect on the control of traffic and the benefits in economy. He said that the Rock Island now has 40 motor cars, which operate 2,500,000 miles, or approximately 2.5 per cent of the total passenger mileage, at a cost which approximates one-half of the revenue per mile. He said that some of the cars handle as many as three trailers, while one rail motor-car has handled a sleeping car.

Another subject upon which there was considerable discussion, was the curtailment and changes in service to meet the existing traffic depression and highway competition. The discussion showed that state highway commissions and the public were co-operating to a great extent in the discontinuing of unprofitable trains and the substitution of more economical forms of transportation for steam service. H. E. Watts, passenger traffic manager of the Wabash, was of the opinion that 85 per cent of the decline in railroad passenger business is due to the private automobile and that nothing can bring it back. Mr. Watts also discussed the pooling of passenger service, particularly between Chicago and St. Louis, saying that a study of this service showed pooling to be impracticable, but that some curtailment would be economical. As a result the carriers reduced the service between these two points to 13 trains, practically all of which are earning a favorable return per mile. The general discussion of pooling revealed much opposition to the practice.

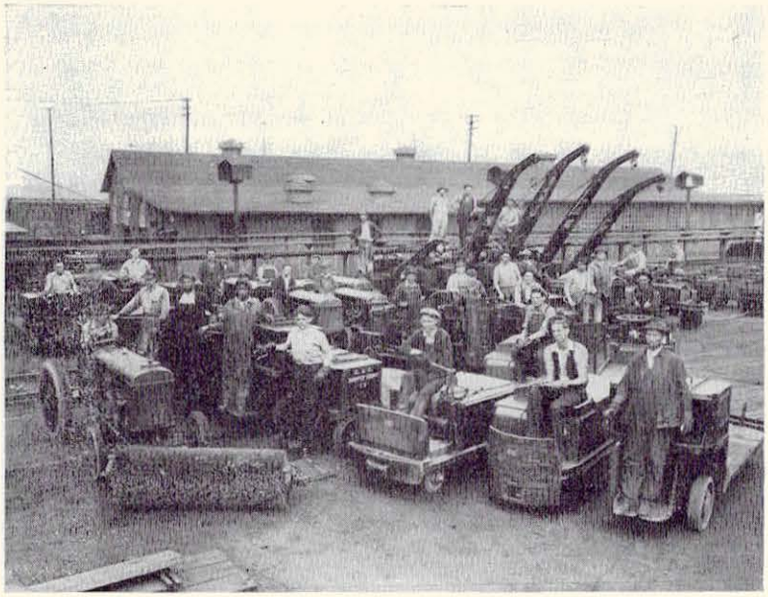
In discussing methods of stimulating traffic, many expressed the opinion that because of the low cost of operating private automobiles and the low rate charged by motor coaches, the railroads would have to adjust their rates at some points to meet competition. It was generally agreed that there should be no change in the standard fare but that the railroads should continue to stimulate travel by special rates and occasionally by reduced round-trip fares. As examples of business being stimulated by reductions in one-way fares, the experience of the Pennsylvania and the Reading between Philadelphia and Atlantic City, the Chicago, Milwaukee, St. Paul & Pacific and the Chicago & North Western between Chicago and Milwaukee, and the three-fifths of one-way fare excursions operated by the Illinois Central in April were cited.

The handling of privately-owned automobiles in freight or passenger service at the rate of five passenger fares for one automobile and two passengers was considered an effective means of stimulating a certain class of travel. The experience of railroads which have employed this type of service shows that thus far the business has been limited to the larger types of cars and if the service can be made more attractive the large field of middle class cars will be open to the railroads. L. W. Landman, general passenger traffic manager of the New York Central, suggested that the shipping plan be placed in effect on all railroads so as to insure the prompt handling of cars over connecting lines and that the rates be made attractive to the medium type car owner. It was also suggested that the rates be based on the length or weight of the automobile.

The elimination of some city ticket offices and other ways of effecting economies in operation were given some consideration, the discussion dealing with individual and consolidated offices and offices in "colonies." The establishment of numerous city ticket offices was generally favored, particularly as a means of competing with motor coach offices which are so frequent. The consolidated ticket office was considered advisable in certain places and under certain conditions but some members thought that all railroads do not fare alike since personnel and location of space are influencing factors. The favored type of city ticket office was that located in "colonies" of such offices.

During the discussion of unity in time-table folders, A. Cotsworth, Jr., passenger traffic manager of the Chicago, Burlington & Quincy, recommended that certain types of information common to the folders of all railroads be shown in the same place in each, that an attempt be made to simplify the information now included in folders, and that an index be arranged so that the service between the principal points can be located at a glance. A committee was appointed to study the folder lay-out and confer with the ticket agents' association with a view to standardizing the folder.

Motorized Material Handling Well Developed on C. & O.



Interplant Motive Power at Huntington, W. Va.

Supply and shop work benefit by systematic operations of large tractor equipment—Cost and man-hour studies made

UNUSUALLY complete and systematic methods have been developed on the Chesapeake & Ohio for distributing and otherwise handling material at its shop points. At Huntington, the location of the general stores and the largest locomotive repair shop, mechanical and stores forces have organized a unified and closely-supervised service of interplant haulage embracing 40 mobile power units and approximately 1,000 units of auxiliary equipment which serve the 80-acre plant on the principle of a small railroad. This railroad within a railroad has main lines, branch lines, freight yards, dispatchers, running schedules, and even signal apparatus, including 53 telephones.

Cost and Time Studies

It did a six million dollar business in 1929, measured by the value of the material issued to shops, a three million dollar business in 1930, and a half-million dollar business in the first four months of 1931, besides doing interplant handling and loading and unloading of supplies for use at outside points. A report of a cost study of the operation by investigators from the road's general offices is authority for the statement that the system has proved practical and economical for the terminal, while savings as high as $20,000 a year, under normal conditions, are credited to the unification of operations alone, the result in large part of eliminating waste handling and of performing the work with lower priced labor.

Typical examples of work performed in the regular course of business are given as follows:

TIME STUDY A

16 tanks oxygen ordered	9:00 a.m.
Equipment located	9:15
Material loaded	9:21
Delivery completed	9:26
Time	26 min.

TIME STUDY B

Trash load picked up	9:25
Delivered at junction	9:27
Placed in main-line movement	9:37
Delivered at dump	9:42
Unloaded	9:46
Time	21 min.

TIME STUDY C

18 draft gears ordered	9:45
Equipment located	9:50
Coupling made	9:52
Delivered 1,000 ft.	10:00
Time	15 min.

TIME STUDY D

120 staybolts ordered	2:00 p.m.
Order collected	2:06
Order reached dispatcher	2:11
Order relayed to stockman	2:12
Material loaded	2:22
Tractor movement begun	2:28
Delivery completed	2:35
Time	35 min.

Tractor delivered bolts to 12 other points on this trip.

TIME STUDY E

Tractor started at west end of yard	
Collected 2 loads at tank shop	1:05 p.m.
Collected 2 loads at battery shop	1:07
Collected 1 load at air-brake shop	1:10
Collected 2 loads at supply yard	1:14
Dropped 1 load and added 1 load at main terminal	1:20
Dropped all loads at store terminal	1:26
Storehouse tractor picked up loads	1:30
Material unloaded in cars	1:40
Empty trailers returned to terminal	1:43
Time	38 min.

Man-Hour Studies

For the purpose of the article, man-hour studies were made of representative handling operations at Huntington to develop a comparison between the present and previous methods of performing the work. These studies were made by noting the work required to handle random loads undergoing movement in the regular way, and by the old hand methods. The motorized methods were shown by these studies to require from one-third

to one-eighteenth as much work, as will appear from the following examples.

Nine barrels of journal packing weighing 3,550 lb. moved from burner to store-room, 1,650 ft., by four men.

	Man-hours	Labor cost	Lb. per man-hour
Hand methods	2.7	$1.08	1,311
Motor methods	0.3	0.13	10,650

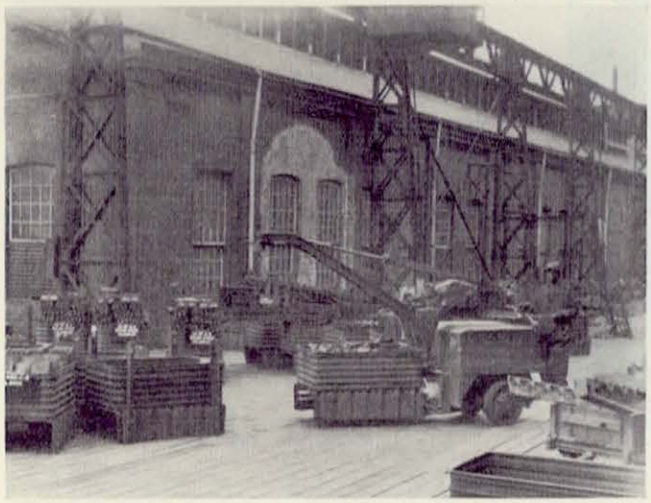
Eight brake beams, wt. 736 lb., delivered 850 ft. by four men.

	Man-hours	Labor cost	Lb. per man-hour
Hand methods	11/30	$0.15	2,007
Motor methods	5/30	$0.07	4,416

Four couplers, wt. 1,560 lb., delivered 837 ft. by four men.

	Man-hours	Labor cost	Lb. per man-hour
Hand methods	7/15	$0.18	3,343
Motor methods	2/15	0.05	11,700

Journal bearings are shipped from Huntington in cans. With motorized methods it took a tractor driver 12 min. to load 100 journal bearings weighing 2,500 lb. into three cans, haul the trailer load and place the cans in the car—a labor expenditure of 1/5 man-hour. The



Lift Trucks Are Also Used at Huntington

equivalent work by hand methods took four men 41 min., or 3.1 man-hours. Through the ability of the tractor driver to haul several loads at once, the tractor driver handled a load six times as large in 47 min., or 0.78 man-hours, while the same work required the four men, using hand wagons, a total of 288 min., or an expenditure of 18.8 man-hours—over 18 times the work.

The present arrangement was effected in February, 1929, when the stores department combined the shop work with the supply delivery work it had started two years previous. Under this arrangement, the stores department delivers all supplies required in the terminal, except those secured after midnight, and also performs all other forms of transportation in the plant for which trackless equipment is adapted.

A Machine for Every Purpose

The equipment for stores delivery, shop transportation and other work in Huntington, not counting several electric cranes permanently assigned to the shop forces, consists of 40 power units and approximately 1,000 trailers and special carriages, as follows:

3 electric crane trucks, 16-ft. boom	64 trailers for boiler tubes
12 electric platform trucks	66 trailers for hot metals
1 electric lift truck	27 trailers for heavy duty
2 electric lift trucks with telescopic boom	21 trailers, three-wheel
	344 trailers, box bodies
5 electric tractors	65 shop-made trailers
2 gas tractors with snow brooms	15 dump trailers, rubber tread
10 gas tractors	88 trailers, other kinds
4 gas platform trucks	16 warehouse trucks on casters
40 tractors—all kinds	30 combination trailers and skids
1 barrel stacker	899 trailers of all kinds
1 jack lift truck	52 standard skids, metal with boxes
6 mail carts	34 nesting boxes for skids
98 trailers, rubber treads	24 skids for cab mountings
34 trailers for mounted wheels	11 skids for oxygen and acetylene
1 trailer for driving wheels	3 shop-made skids
90 skids—all kinds	

The portable material-handling equipment at Russell, Ky., where new car shops are located, consists of:

1 crane-type electric truck	12 all-steel wagons
3 electric lift trucks	10 all-steel dump trucks
1 platform-type electric truck	14 mounted-wheel conveyors
3 narrow-gage tractors	4 three-wheel lumber trailers
95 four-wheel trailers	4 four-wheel lumber trailers
255 skid platforms and boxes	

Yards for Empties

It is almost a mile from one end of the yard at Huntington to the other. To utilize the equipment advantageously, certain of the tractors are assigned to operate over the main route, picking up designated loads and empty trailers at junction points with other routes and placing them at designated terminals. Depending upon conditions, these trailers may operate on a thorough schedule in one direction and do local work on the return trip. Other tractors are assigned to local work at the storehouse or along fixed routes in different shops, while still other equipment is assigned to emergency or special work. All equipment is numbered for identification and all unassigned trailers are pooled so that they can be shifted from one location to another, as required. Indispensable to the operation are three terminals, or yards, along the main route, where empty trailers are collected and where dispatchers receive calls for empty equipment, supervise the reclassification of loads for main or branch-line movement and time the tractor movements.

Shop foremen originate routine deliveries of stores material by filling out requisitions designating the station number or special location and placing them in the nearest mail box, from which a boy on foot or bicycle picks them up while making scheduled rounds. There are over 70 of these boxes and the time of collection is marked on the form in each box. A dispatcher at the general store pigeon-holes the orders for the attention of the proper stockmen who receive the orders by messenger and assemble the material for delivery, settling any questions with the shop foremen through the telephone, if necessary, likewise calling upon the store delivery foremen for the required trailers and notifying the dispatcher when the loads, properly labelled, are ready for tractor movement. Small lots of material or rush orders received by telephone are delivered by hand cart or by the storehouse platform truck, where necessary.

Where no immediate movement is required, orders for empty trailers or for the movement of shop material are also placed in the station boxes for scheduled collection, while interplant orders are placed directly on the dispatcher at the general storehouse by telephone. In such cases, the dispatcher enters the phone call in a day book, with the description of the work and the points of origin and destination by station number. Examples of orders taken at random from the day book are as follows:

	Tractor Number
2 baggage-truck wheels at Box 7 to Section 13	19
3 loads Section 15WC to Box 27	13
12 pr. mounted wheels from Box 50 to Box 55	27
1 electric crane to West dump	36
1 electric crane to Section 17F	34
1 load sand at Box 3 to Box 12	46
100 lb. ice to Box 6	46
1 hospital cot at Box 4 to Section 13	22
2 loads at Box 103 to Box 6	13
Concrete roller to ball diamond	24
Driving boxes from 38 to Box 28	1
1 load time card at time office to file-room	1
1 motor at old Section 11 to Section 20	22
3 loads drums at 53 to drum yard	19
2 loads dirt south of Box 34 to dump	13

Color-Light Signals

Upon receiving such orders, the dispatcher communicates with one of the terminals or with the proper

section stockman, as the case may be, to provide the equipment and issue the orders to the proper tractor driver. If the work requires a main-line movement, the dispatcher uses three color-light signals, each of which is located at a strategic point along the main line and carries three lenses, the upper lens for the attention of one group of main-line tractor drivers, the center lens for another group, and the lower lens for still another group.

A red light turned on by a switch on the dispatcher's desk requires the approaching driver, if the light is in his quadrant, to stop at the nearest telephone booth, where a magneto telephone enables him to communicate with the dispatcher without going to the office. Here the driver gets his orders to pick up designated loads for movement to designated stations along the main line. Where the work of the truck driver is localized and the transportation problem is simply one of moving material from one machine to another in a shop, etc., the drivers on these routes are responsive to orders received directly from the shop foremen.

Receiving Order by Telephone

Placing Order in Wicket for Stock Clerk

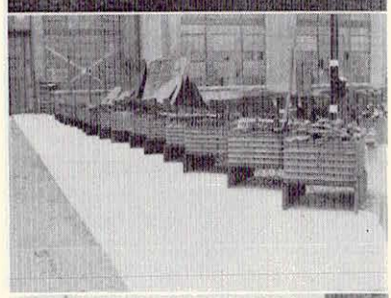
Setting Signal to Stop Main-Line Tractor

Passing Driver Sees Red Light

Stops at Nearest Phone for Orders

Boiler Tubes for Engines Under Repair

Skids with Lubricator and Injector Parts from Locomotives



Skid Loads of Grates from Engines Under Repair

Cans for Shipping Small Supplies Between Stores

One Man Moving Ten Mounted Wheels

Tractor Schedules

The plan contemplates that the transportation forces will deliver material to the actual point of use. Where space is available, unnecessary handling is eliminated by not unloading trailers at the time of delivery, and the transport work ends with the placing of the trailers at the proper locations; otherwise, the trailers are unloaded by the supply department, except where shop cranes are available for this purpose. The shop forces are usually expected to load trailers, although the supply

department performs both loading and unloading work where the material is moved by platform truck.

To facilitate operations, a tractor schedule board is maintained at the central car yard, showing the route and the arrival time of each tractor. A record is also kept showing the time that each order for empty trailers was received and the time that these trailers were delivered.

The operation is supervised by a store delivery foreman who makes out two daily reports of the operations. One form shows the number of requisitions received for material, the number of items ordered, and the number of items delivered in each material section during each of the three shifts, while the other form is a summary statement giving the total number of requisitions filed, the items ordered and delivered, and the cost per requisition of the day's work. A report for May 20, 1931, selected at random, showed 819 requisitions filled, 1,467 items ordered, and 1,420 items delivered, with 8 requisitions presented at the counter, all of the latter being received on the third shift when no delivery work is performed.

Haulage for Shops Extensive

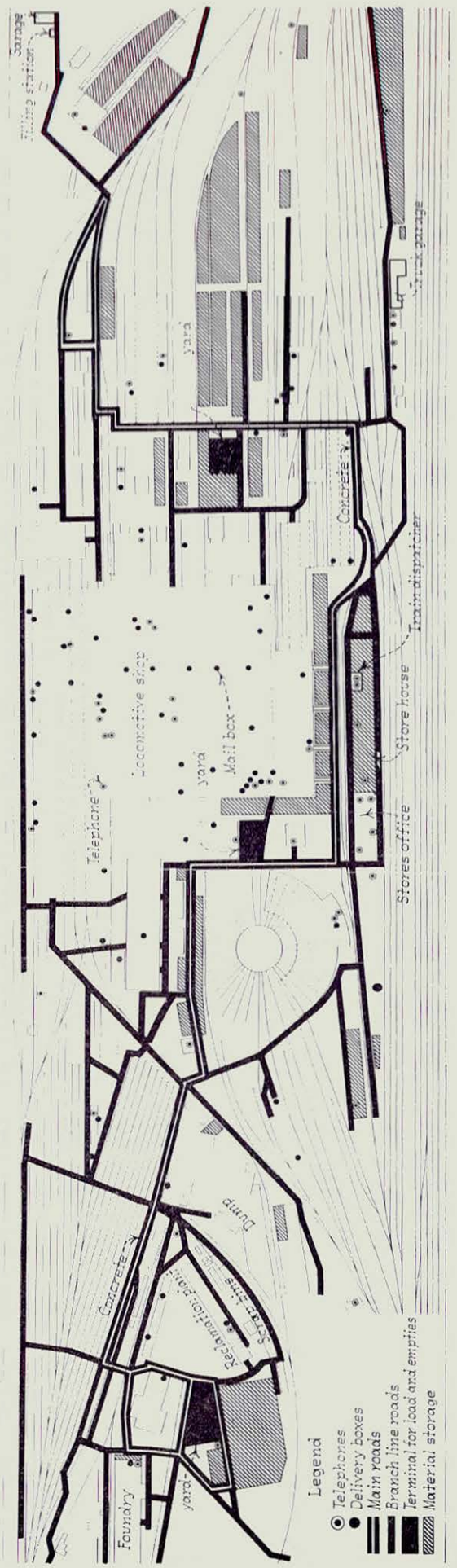
Statistics are available which not only afford an insight into the extent of the transportation operations, but especially the amount of shop haulage that is included in the work. So far as the strictly stores delivery work can be distinguished from intershop haulage under the unified operation and considering also the reduction in man-power incident to the use of motorized equipment, the shop haulage required 56 employees of all kinds and a pay-roll expense of $43,614 in 1929, when the issues to shops totaled $6,272,000, compared with 67 employees engaged in shop delivery work; it required 38 employees for the shop work, compared with 32 employees for store delivery work, in 1930, when issues were $3,085,000, and it required 16 employees for the shop work, compared with 17 for store delivery during the first four months of 1931 when issues were $558,000, the decline in the number of employees in each case resulting principally from the curtailed shop operations attendant upon the country-wide depression.

Special Equipment for Shops

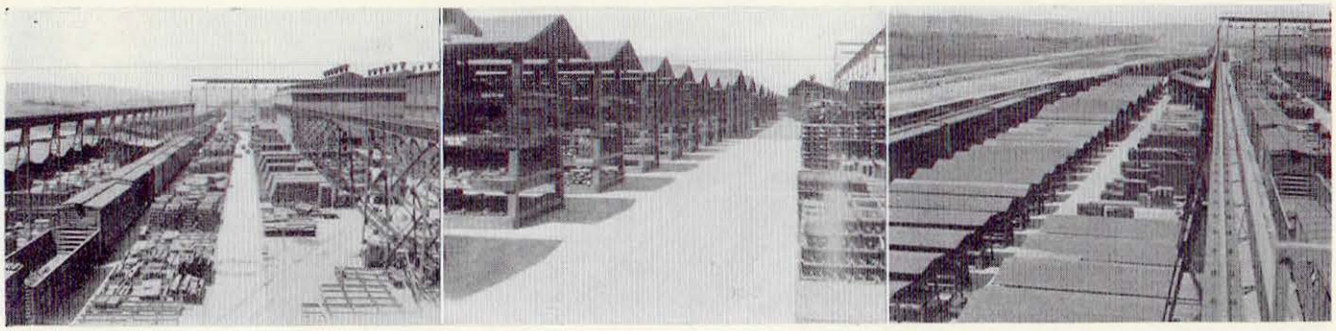
To a large extent, such shop materials as boiler tubes and grates temporarily stripped from locomotives are stored out of the way on flue trailers and skids. For air-brake equipment, injectors, gages, etc., the shop has purchased special skids, which are divided into compartments of suitable size to receive their respective parts. When the parts are stripped from the locomotives, they are placed in these special skids. The skids are then hauled by a power lift truck to an elevator and raised to the mezzanine floor where the skids are moved by hand lift trucks to the repair department; here they remain until the parts are repaired and are ordered for movement back to the locomotive.

For convenience of movement by lift truck or tractor, it was found desirable to purchase skids mounted on caster wheels. These skids, being designed with only 6-in. sides, are especially useful for the brake rigging department.

The shops have also recently developed a special skid for handling jacket steel in a similar manner. All the equipment carries hooks for handling by shop cranes. Included among the equipment at Huntington, also, are a large number of metal boxes about 12 in. square and 6 in., or more, in depth, equipped with



Huntington Yard Showing Main Line and Branch Lines of Shop Transport; Also Location of Three Terminals, Mail Boxes and Telephones



Supply Facilities at Russell, Ky., Where Motorized Equipment Expedites Car-Repair Work

handles, several of which, filled with small orders of bolts and similar articles can be placed on a trailer for delivery.

Scrap Handled Cheaply

The scrap yard is located where the ground is low and is served by an elevated platform, the top of which is level with the tractor runs. The platform is flanked on one side by bins made of old steel car bodies, and on the other side by a track for standard-gage equipment. Miscellaneous scrap gathered from the shop district or received from outside points, which do not produce enough scrap to ship direct to market, is hauled to the yard in the dump wagons or trailers in which the scrap is often already sorted so that the load can be dumped directly into cars for sale. Otherwise, the scrap is sorted as it is unloaded into the bins and stored in them until a sufficient amount has accumulated for sale, when it is loaded by magnet. This operation not only avoids expense in accumulating the scrap but also in preparing it for market.

Included in the system is an oil-supply train which consists of specially-designed trailers equipped with tanks and containers for supplying all foremen at weekly intervals with lubricants, journal packing, grease and similar materials. This operation, in connection with which a record is kept of the quantity supplied each foreman, has practically eliminated the necessity of shop men calling at the oil-house and store for these supplies and has also afforded the means of promoting conservation in the use of the materials.

Lift Trucks Used

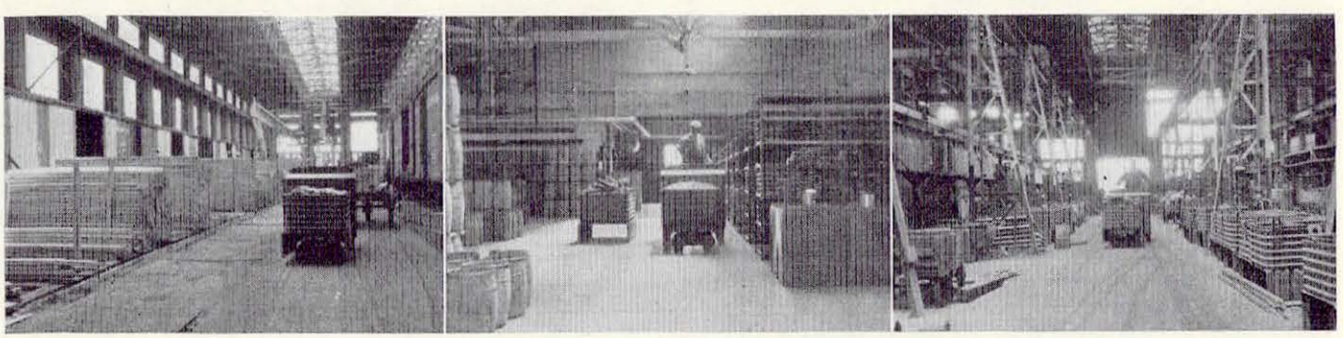
Lift-truck and skid operations are employed extensively at Russell, Ky., where the road has built large car-repair facilities. They are also employed to some extent at Huntington for storing parts stripped from locomotives and such supplies as brake shoes which can be distributed in skid lots, but principally, as explained, because of the small quantity of most items shipped at one time to outside stores which operate under an unusually small inventory, few shipments are made on skids. However, considerable material is handled in drums or cans previously used for journal packing. These cans are scrupulously clean and are equipped with covers and handles and, when loaded with miscellaneous materials in the storehouse, can easily be lifted by hand into trailers for movement to outgoing cars. Where skids are used, such equipment for the most part is also equipped with hooks for handling by shop cranes.

Facilitate Car Repairs

At Russell, Ky., lift trucks and skids predominate, their use appearing from the following description of car-repair methods there: A series of cars that require repairs is selected, a certain number of the cars are thoroughly inspected, and the quantities of various car parts required is estimated and ordered in sufficient time to allow the material to be assembled before the program is scheduled to start. The small parts are segregated on platforms and the fabricated sheets are assembled under a gantry crane near the blacksmith shop, from which point they are moved into the blacksmith shop by a transverse crane. The small parts are delivered by lift truck in skid boxes on trailer wagons and placed at the positions where the material is to be used.

The cars are received in the yard shortly before the work is scheduled to start until the complete number of cars for the program have been received. As 16 cars are repaired daily, at least 16 cars are brought to the burner shop each day, cut down and sent to the erecting shop, where they are repaired by the progressive system so that when each car finally passes out of the door it is ready for sandblasting and painting. The blasting material is unloaded directly from cars into hoppers, from which it is used, and requires no delivery. The paint, which is stored on a platform at the paint shop, is delivered to the tanks in the paint shop by platform-type electric trucks.

The old sheets are loaded into cars by a gantry crane, as they are burned off the cars, and when a scrap car is full, it is ready to be weighed for shipment to the buyer. The rivet heads are picked up with a magnet,



Lift Truck Operations in the Storehouse and Car-Repair Shop at Russell, Where Small Materials are Handled in Skid Lots for Program Work

loaded into skids and hauled about 100 ft. to the scrap dock.

Tractor Cost Data

The Huntington operation affords data on the cost of trackless material handling. Using the value of issues as a rough measure of the cost of operations, the total labor cost was $9.71 for delivery and $6.95 for shop work per $1,000 of material issued in the shop in 1929; it amounted to $9.17 for delivery and $13 for shop work per $1,000 of issues in 1930; and to $9.10 for delivery work and $10.50 for shop work in 1931. The reported cost of the store delivery work per item handled was 12.13 cents in 1929, 8.29 cents in 1930, and 6.88 cents in 1931.

Records of 14 tractors over a nine-month period showed an average cost for gasoline, oil and grease, for the gasoline tractors, of 61.35 cents per day per tractor, computed as follows:

Gasoline	45.89 cents
Oil	11.71 cents
Grease	03.75 cents
Total	61.35 cents

The comparative cost of electric tractors, based on an average consumption of 18 kw.-hr. per day at 1.1 cents per kw.-hr., has been estimated at 53.95 cents per tractor per day, computed as follows:

Electric current	20.00 cents
Estimated labor for charging	30.20 cents
Estimated grease	3.75 cents
Total	53.95 cents

At the time of the cost study of tractor operations at Huntington, 22 of the 38 tractors, etc., at the terminal were assigned to the transportation work, representing an investment of $40,331, which gave a carrying charge of $1.05 per tractor per day, while the 718 trailers in use, representing an investment of $49,088, showed a carrying charge of $0.039 per trailer per day, considering depreciation at 10 per cent, maintenance, taxes and insurance at 5 per cent, and interest on the investment at 6 per cent. Based on 1,901 loaded trailers, empty trailers and other units of work handled by the tractor drivers during the day set apart for the cost study, and based on the prevailing rate of pay for all labor chargeable to the operation, the mechanical handling method at Huntington was performed at a cost of 13.11 cents per load, this value being computed as follows:

Item of cost	Work cost per unit (Cents)
Driver cost	3.98
Supervision	1.51
General labor	4.26
Power, fuel, oil and grease	.65
Operating cost	10.40
Carrying charges, 22 tractors and all trailers	2.71
Total cost	13.11

Cut Idle Time

The operating cost per load has since been reduced to approximately 9.26 cents per unit of work as a result of the readjustment of routes and equipment made to reduce the idle time of tractors to 16.30 per cent of the total time, or an average of 1 hr. 18 min., which was found to be the average time required for loading operations. The importance attached to the unified operation of the material-handling equipment and to its close supervision is shown by the fact that the idle time on some routes was found to range from 2 hr. to more than 4 hr., instead of the allowable 1 hr. 18 min. In every case, it is pointed out, the effort is made to provide an efficient service by fully utilizing the time of a limited number of machines operating over well-chosen routes rather than to employ all of the machines at the expense of excessive lost time. The likelihood of lost time is watched particularly during a period like the present when curtailed shop operations do not require the full capacity of the transportation plant.

Detroit Hearing on Operating Practices

THE Interstate Commerce Commission continued its investigation of the terminal services of the railways in Ex Parte 104—Practices Affecting Operating Revenues and Expenses—with a hearing at Detroit, Mich., on October 26. However, it seemed to be proceeding on a basis somewhat different from that which obtained in the earlier hearings. The purpose of the commission's representatives now, it appears, is to obtain only a broad picture of the practices of the railways in providing terminal services, deferring until possible later hearings the development of detailed information concerning the arrangements in effect.

The points concerning which the commission is most keenly interested are indicated by the questions put to the witnesses by the commission's attorneys. Briefly, these questions go into the following subjects: The extent to which individual carriers absorb switching charges, and the reasons therefor; whether switching charges are absorbed on non-competitive as well as competitive freight; the amounts involved in the absorption of switching charges; the comparative amounts of charges for industrial switching and for switching, on a reciprocal basis, of road-haul freight; the practices in effect at industrial plants with respect to the spotting of cars for loading and unloading; and the reasons for the different arrangements.

Examiner C. B. Bardwell presided at the Detroit hearing. Cross-examination of witnesses was conducted by attorneys A. G. Hagerty and R. A. Gwynn, for the commission, and by J. S. Burchmore, representing the National Industrial Traffic League.

The Ann Arbor was the first road to present testimony. Its operating department witness explained that there is only one plant on the Ann Arbor which does its own intra-plant switching, the Ann Arbor delivering cars to the end of its own line and making no allowance for the further spotting of cars by the plant locomotive. H. S. Bradley, traffic manager of the Ann Arbor, followed with testimony describing the tariffs in effect covering terminal services. He said that road-haul rates include delivery to and receipt from all tracks of the railway in the industrial district of each city served, and also delivery to and receipt from industrial and team tracks of connecting lines. Replying to questions put by Attorney Hagerty, Mr. Bradley said that the Ann Arbor absorbs switching charges on non-competitive as well as competitive freight. He explained that switching charges assessed against connecting lines are on a reciprocal basis, the Ann Arbor charging the same as it is charged by its connections for similar service.

Mr. Burchmore asked whether the Ann Arbor will spot a loaded car at the point where it is to be unloaded without charging extra, to which Mr. Bradley

(Continued on page 682)

Short Lines Consider Railway Situation

Discuss pending legislation, consolidation, recapture and other matters at eighteenth annual meeting in Louisville, Ky.

MEMBERS of the American Short Line Railroad Association, at their eighteenth annual meeting, which was held in Louisville, Ky., on October 14-15, heard reports from their officers concerning the existing situation with respect to the railways as a whole, and the short lines individually, and discussed such topics as the petition for a 15-per cent increase in freight rates, the investigation of the Interstate Commerce Commission into the practices of the carriers affecting their operating revenues or expenses, legislation to be expected, the status of consolidation, and recapture of earnings. Several resolutions bearing upon the present difficulties of the railways and means of relieving them were adopted. One of these was to request the President of the United States, as a part of his reported plan for rehabilitation of the railways, to include the repeal of the recapture clause of the Interstate Commerce Act, and also modification of the rate-making section. Other resolutions called for regulation of highway and waterway transportation by the Interstate Commerce Commission in the same manner as railways are regulated, and congressional action to provide for loans to be made available to needy railroads out of a revolving fund.

Opening the meeting, Bird M. Robinson, president of the association, presented a report dealing with the conditions confronting the railroads. This report is abstracted below:

Annual Message

By Bird M. Robinson*

We have reached the stage where the suffering roads must have relief. If not soon obtained, a large percentage of them will become bankrupt, and that condition will inevitably induce, if it does not force, government ownership. With the hope of obtaining some temporary relief, the great majority of railroads caused a petition to be filed with the Interstate Commerce Commission asking for a 15-per cent increase in revenue. The commission thereupon instituted its proceeding, Ex Parte 103, and has since, with unusual expedition, conducted exhaustive hearings in all sections of the country.

Many of the state commissions, numerous chambers of commerce, boards of trade, associations and shippers, protested and contested the proposed increase very vigorously, and presented facts to show that a very large part of business concerns throughout the country were in a depressed condition and should not be called upon at this time to pay increased rates. No doubt, the majority presented the facts as to their respective business, but they either overlooked or ignored the fundamental difference between their privately-owned and conducted businesses, and that of the railroads, which are not only governed and restricted by the government, but forced to render service regardless of conditions.

Government Ownership the Alternative to Consolidation

In my opinion, the consolidation of all, or practically all, of our railroads into a limited number of balanced, competitive systems, is the one action that will do more to preserve the roads in full vigor permanently, for the public, than any other, and I believe that fact is now more apparent than at any time in the past.

Developments during 1930 and 1931 have convinced me that the public and the railroads are now confronted with one alternative—consolidation or government ownership of the railroads. That statement may startle the public and many of my hearers, but I regard it as inevitable, for economic reasons that are inherent in the situation and cannot be avoided.

The developments during the period which the government operated most of the railroads convinced your executive, as well as many members, that consolidation of the roads offered the best if not the only solution of the many difficulties confronting the roads at that time. We not only actively, but very successfully, participated in presenting the facts to Congress, and we may justly claim credit for the result of our part of the work then involved.

When presenting that proposition to the very able members of Congress, who constructed the Transportation Act, we called attention to the fact that, with very rare exceptions, our railroads were constructed as short lines, and practically all our great systems have been created by the absorption of that class of roads. More than 6,500 short lines have been merged into the large systems, and as that process may be said to have progressed in a more or less haphazard way, it created conditions that were so unequal in mileage, location and traffic, and in many other respects, it has been almost impossible to harmonize or equalize them. During that period the railroads had practically a monopoly of the transportation business of the country, and because of that fact, the approximately 700 short lines still in existence were able to continue their service, most of them at a profit; but as a result of the developments during the War, and the competition that has grown up since that time, the short and weak roads have been placed at a great disadvantage. Many of them may have to be discontinued unless they are merged with the strong lines, and thereby preserved as part of the transportation facilities for the benefit of the public. That statement is sustained by the fact that the Interstate Commerce Commission has, from 1921 to 1930 inclusive, authorized the abandonment of 7,215 miles of railroad. The average for the ten years is 721½ miles per year. For 1930, it was 1,807.46 miles, the greatest in any single year.

The failure of the commission to complete its plan for consolidation within a reasonable period has, in my opinion, been very serious, for the reason that little progress was made during the intervening prosperous years. The roads were confronted by so much uncertainty as to what could be done or what the commission would permit to be done, that only a few unifications were made, and only a few short lines were included. Unifications or consolidations could, in all probability, have been made during the prosperous years that cannot now be made. Had they been made some years ago, they could—at least to a great extent—have met in a more successful way the unfair competition that has developed.

The Four-System Plan

We now have something definite with respect to consolidation. The Baltimore & Ohio, the Chesapeake & Ohio, the New York Central and the Pennsylvania filed with the Interstate Commerce Commission, on the first day of October, an application asking it to modify its plan issued on December 9, 1929, to the extent of eliminating the proposed fifth system—Wabash-Norfolk & Western—which the commission then provided for; and to permit said applicants to acquire and consolidate all of the railroads in the Eastern territory (excluding the roads in New England) into four systems.

This association has definite agreements with the Chesapeake & Ohio and the Baltimore & Ohio whereby each

* President, American Short Line Railroad Association.

agrees to acquire and make a part of their respective consolidated systems, stem short lines that connect exclusively with their respective roads, and to acquire other short lines that connect with two or more of said systems, if, when and to the extent the commission may determine they should. In our opinion, the attitude of the public with respect thereto, and the good faith of the applicants in dealing with and acquiring short lines, will be a supreme test of making consolidations. If that is successfully met, the four systems will then afford a supreme test of the success of consolidations. In the meantime, there will, no doubt, be additional applications from other sections of the country, asking authority to consolidate certain roads.

"Commercial" Value

The consideration to be received for roads merged or consolidated is, under the Interstate Commerce Act, a matter largely within the jurisdiction of the Interstate Commerce Commission. It is a matter of vital importance to owners, and I regret to say that the outlook for receiving adequate compensation for roads sold is not encouraging. The commission has in the past, in one case, refused to approve the purchase of a road which had been completed between a willing buyer and a willing seller, under contract duly executed by both parties; and it arbitrarily reduced the price to be paid for said road from $2,300,000 to $1,800,000. We were of the opinion—and so advised the seller—that that act of the commission was contrary to law, and in our opinion, the courts, upon proper presentation of the facts, would set it aside; but, unfortunately for the owners of other roads, the seller of that road decided to take the loss, accept the price fixed by the commission, and transfer the road.

In the New York Central case, the commission announced that the "commercial" value of the short lines then involved should be on the basis on which they were to be acquired. By that it meant, in the final analysis, the value of the roads as a business investment, and it has since practically adopted that as a basis of value for short lines. It is difficult to imagine a more unjust or unfair basis of value. It ignores the real value of the physical property, even the very low value fixed by it after years of very minute inspection and investigation by its own experts; it ignores surroundings, developments, etc., and it ruthlessly disregards the rights of the owners who have heretofore aided in developing the country by investing their funds in constructing roads, which must be retained in the interest of the public; otherwise, the acquisition or inclusion of such roads would not be authorized by the commission.

The earnings of all roads have decreased enormously during the last two years. The net earnings of Class I roads decreased $398,584,078 in 1930, and decreased $119,829,038 during the first five months of 1931, as compared with like months of 1930. The net average return for that class of roads, during the latter period, was only 2.1 per cent. Is it commercially sound, because of that great decrease in net earnings, that the commission can, or should, establish a new basis of value, or apply its so-called "commercial value" to that class of roads? If not, can it single out the short lines and apply such a value basis to them, and them only? If that "commercial value" basis is to be applied to all of the roads, the losses to the owners will be enormous, and that in addition to the very large losses being incurred in the operation of the roads, in the service of the public.

In view of the fact that our members have several times voted in favor of consolidations; that they have heretofore authorized us to support a Four-Party Plan in the Eastern territory; that the provisions of that plan include connecting short lines, and that two of the four systems involved in that plan have made with us a fair and reasonable contract with respect to connecting short lines; and in view of the serious results that would probably follow government ownership, we strongly favor adoption of the Four-Party Plan and will participate actively and aggressively in the work necessary to accomplish that result.

Irresponsible Regulation

The public was served efficiently by the railroads privately owned and operated, for many years before the World War; the government then took possession of what roads it wanted and operated them in such an arbitrary and inefficient way that the public was greatly pleased when the roads were returned to their owners, since which time the service has been efficient and adequate. Notwithstanding that experience, and the almost universal disapproval of the government service, apparently few people realize that in the meantime the governments, national and state, have adopted and made effective laws, plans and practices governing the railroads that are doing more than all else to strangle or cripple them in a way, and to the extent that they are, one by one, becoming bankrupt, and are beginning to topple over the precipice. Present conditions do not promise adequate relief. If that cannot otherwise be obtained, the government will be forced to assume the responsibility of furnishing rail transportation, without which the business of the country cannot be successfully conducted.

It now appears that a large part of our people believe that the way to meet an emergency, in almost all kinds of business, is to have the government advance the money. Among numerous proposals that the government furnish funds for special kinds of business, through banks which it would create for that purpose, we find many proposals for a Federal Railroad Loan Bank. The most recent authoritative suggestion for such a bank was made by Mr. Shaughnessy, chairman of the Public Service Commission of Nevada, in his testimony before the Interstate Commerce Commission in its hearings in Ex Parte 103. He urged Congress to create a Federal Railroad Loan Bank, and supply it with funds advanced out of the Treasury, and said: "There should be created a revolving fund, and to the extent that there is amortization and issuance of bonds, equipment trusts and short term notes, the government should become an owner in the proportion which its investment bears to the total. It should have a voice in questions relating to the necessity and extent of additions and betterments, to the end that its equity may be safeguarded."

His proposition that "the government should become an owner in the proportion which its investment bears to the total" is in accord with practically all plans suggested for the government to advance funds to the railroads. In this connection, I call attention to the age-old adage: "Let the camel get his nose under the flap of the tent and his body will follow soon thereafter."

Topics Discussed

Following the report of the president, Ben F. Cain, vice-president and general counsel, reported on the work being done by himself and by the legal department. This report included discussion of the Prescott & North Western recapture case, the proposed increase in freight rates, the Southern Pacific-Cotton Belt case, the Interstate Commerce Commission's investigation concerning the co-ordination of motor transportation, the per diem case, the mechanical stoker and power-reverse gear cases, and an analysis of legislation in which the association has taken an interest. Carrying out the plan to define clearly the activities and achievements of the association, Mr. Robinson later presented a report on the outstanding accomplishments of the association for the protection of the short line railroads since 1919. A description of the activities of the traffic department was presented by John A. Streyer, general traffic manager of the association.

The first topic docketed for discussion was the demand of firemen for installation of automatic stokers and that of enginemen for power-reverse gear, I.C.C. Dockets 24049 and 24050. Mr. Cain stated that the amount of money involved, in case the short line railroads are compelled to install stokers and power-reverse gear, is in the neighborhood of four million dollars. He told of the efforts to have the short lines exempted from any order issued by the commission in these cases.

Concerning the application of the railways for a 15-per cent increase in freight rates, Mr. Robinson described the testimony presented in opposition to the application. He admitted the poor condition of many shippers, as indicated by their testimony. He stated that some members of the association opposed the increase, feeling that it would be detrimental to their own interests.

Mr. Cain described the first two hearings in the Interstate Commerce Commission's investigation into the practices of carriers affecting their operating revenues and expenses. Testimony developed at the hear-

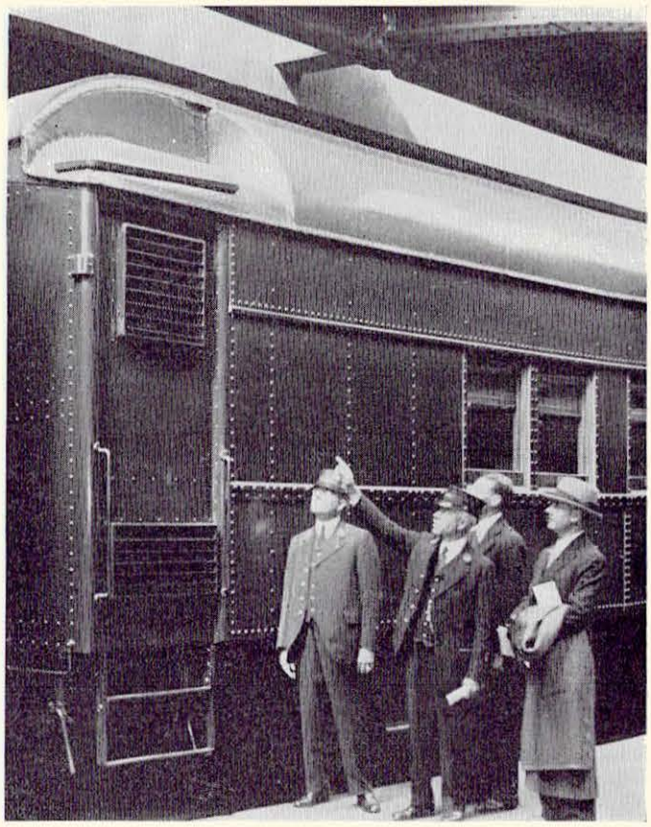
(Continued on page 683)

Three Air-Conditioned Trains Operated by the Baltimore & Ohio

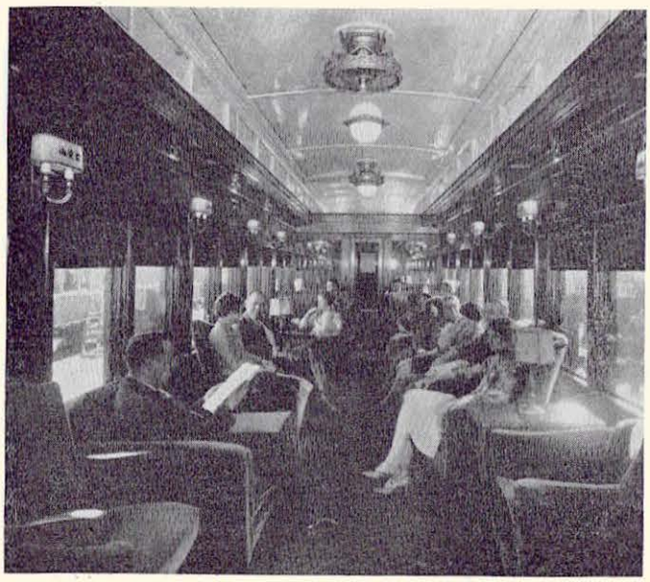
"Columbian" and "New York-Washington Express" composed entirely of air conditioned cars—Parlor cars operated between New York and Washington on the "New York-Cincinnati-St-Louis Express"

TO meet the popular demand for air-cooled cars, the Baltimore & Ohio is now operating three trains in each direction between New York and Washington, D. C., the cars of which have air-conditioning equipment. Two of the trains, the "Columbian" and "New York-Washington Express" are composed entirely of passenger cars equipped for air conditioning, while the "New York-Cincinnati-St. Louis Express" has only the parlor cars thus equipped. At the present time the B. & O. has 38 air-conditioned cars in service, largely between Washington and New York.

The first completely air-conditioned train to be placed in service was the "Columbian" which service was inaugurated May 24, 1931. The other two trains were placed in service on July 20. The air-conditioned cars consist of smoking-lounge cars, parlor cars, individual-seat coaches, individual-seat passenger and baggage cars, and dining cars. All of the cars have air conditioning equipment furnished by the York Ice Machinery Corporation, York, Pa., with the exception of dining car "Martha Washington" having equipment furnished by the Carrier Engineering Corporation, Newark, N. J., and dining car "Evelyn Byrd" having equipment furnished by the B. F. Sturtevant Co., Boston, Mass.



Louvres Allow for Circulation of Air Through the Cooling Tower



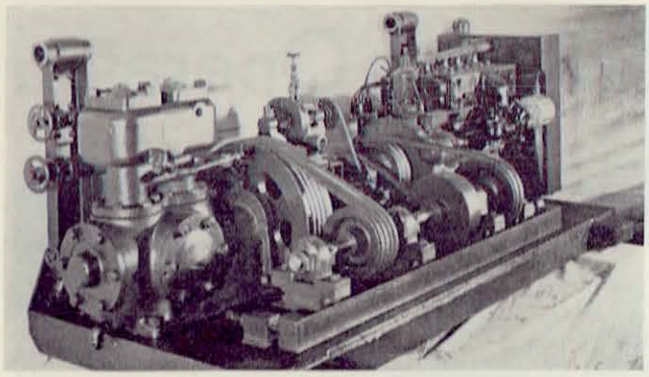
Interior of One of the Lounge Cars

The York System

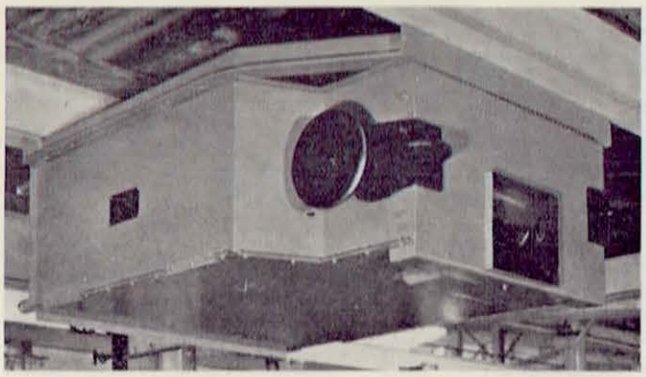
The air-conditioning unit which cools and de-humidifies the air in the cars, contains pipes and surfaces which are cooled by the circulation of brine. This brine in turn is cooled in a brine cooler.

The cycle of refrigeration is closed and is carried on entirely outside of the space occupied by passengers. That part of the apparatus which contains the refrigerant, consists of the brine cooler and compressor located under the car and the cooling tower placed in one side of one of the vestibules.

The refrigerant is taken from the brine cooler by the compressor in the form of a vapor, to the condensing or liquifying coils in the cooling tower where it is cooled by a spray of water, converted to liquid and again passed to the brine cooler through a float regulator. The water used for liquifying the refrigerant in the cooling tower is kept cool by the evaporative effect of the air forced through the cooling tower. A part of this water is lost by evaporation and this is replaced by a supply of water from a make-up tank. The engine-compressor unit is mounted on a structural-steel base and supported underneath the car by rubber-cushioned hangers secured to the underframe. The compressor unit is 7 ft. 7¾ in. long, 2 ft. 11 in. wide,



Type of Power Supply Unit in which the Engine Drives the Compressor and Two Pumps Through a Jack Shaft and Vee Belts



Air Conditioning Unit Installed Over the Passage Way to the Vestibule—A Duct With a Number of Outlets is Used to Distribute the Air

and 2 ft. 7¼ in. high. The brine cooler is a closed insulated shell 6 ft. 5¾ in. long and 12¾ in. in outside diameter.

Cooling and Distribution of Air

The air conditioning unit is installed over the passage way to the vestibule. It contains in addition to the pipe coils for circulating the brine a surge drum and a fan for circulating the air within the car.

The air is distributed through the car by a duct which is located on one side of the car so that the ventilators on the opposite side may be opened in the usual manner in case the air-conditioning equipment is not in operation.

The outlets from the duct are arranged with a system of deflectors so that the air is discharged near the ceiling of the car at low velocity and in such a manner as to mix with the air in the car by gradually descending at an even rate through the passenger space. The air in the car is returned to the air-conditioning unit through a return air grille near the bottom of the unit.

Power Supply

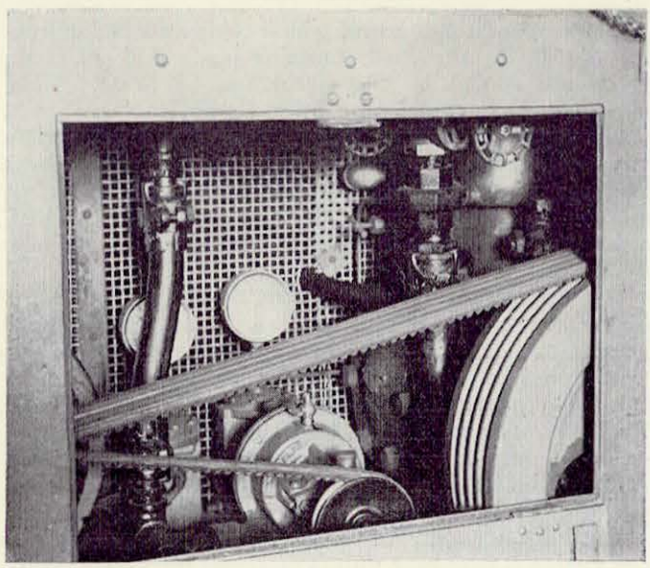
Three types of power equipment are used. In one of these the engine drives the compressor and the brine and water circulating pumps by means of a countershaft and V belts. The dimensions given apply to this unit. When this unit is used, the fans in the air-conditioning unit and cooling tower are driven by electric motors operating from the car lighting battery.

The second type of unit is a direct connected gasoline engine generator set, connected to the car lighting battery, from which the source of power is drawn for operating the air conditioning equipment. When this unit is used, the compressor and water circulating pump, brine circulating pump, air conditioning unit and cooling tower fan are driven by individual motors.

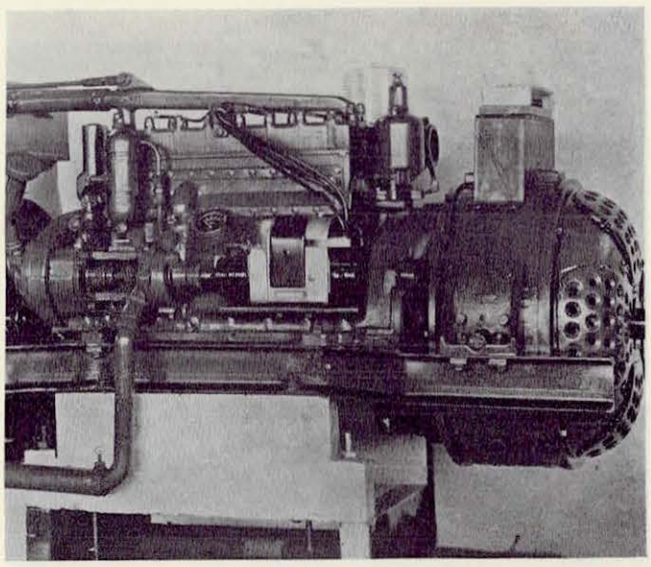
Control

The electric control panel is installed in a space approximately the size of a car lighting panel, and a push button control cabinet is designed for easy access for the operation of the air conditioning equipment. A selector switch is provided so that the fan may be operated without refrigeration for spring and fall weather use. When the air conditioning equipment is in service, thermostat control regulates the proper temperature of air to be discharged into the car and also controls the operation of the compressor.

The cooling equipment described above is subject to patents pending by the Baltimore and Ohio.



Motor-Drive for Pump and Compressor Used With Electric Power Supply Systems



Gasoline Engine-Generator Set Used for Power Supply on Some of the Cars

W. S. Franklin Elected President of Wabash and Ann Arbor

Successor to the late William H. Williams has been assistant to vice-president on the Pennsylvania

WALTER S. FRANKLIN, assistant to the vice-president, operation, of the Pennsylvania, and former president of the Detroit, Toledo & Ironton, was, on October 26, elected president of the Wabash and the Ann Arbor, to succeed the late William H. Williams. Mr. Williams, who was also chairman of the Wabash board of directors, died suddenly at St. Louis, Mo., on October 14, one month after he had been elected to succeed J. E. Taussig in the presidency. Winslow S. Pierce, general counsel, has been acting chairman of the board and of the executive committee since Mr. Williams' death; he continues in those capacities, while Stephen S. Cotter, who has been in active charge of all departments, continues as vice-president in charge of operations at St. Louis.

Walter S. Franklin

The election of Mr. Franklin suggests that the Pennsylvania, which is heavily interested in the Wabash through stock ownership, is now inclined to take a somewhat more active interest in the management of this property. Under the four-party consolidation plan recently filed by the Eastern trunk lines with their petition asking modifications of the Interstate Commerce Commission's five-party plan, the Wabash is assigned to system No. 4—Pennsylvania, and the Ann Arbor to System No. 5—Baltimore & Ohio. At the same time the Pennsylvania is under an order of the I. C. C. requiring it to divest itself of Wabash and Lehigh Valley stock as the result of a Clayton Act proceeding.

Walter S. Franklin was born at Ashland, Md., on May 24, 1884, and received his higher education at Harvard University, Cambridge, Mass., from which he was graduated in 1906. He entered the service of the Pennsylvania on October 1 of the same year as a clerk in the transportation department at Philadelphia, Pa. In the following year he was tranferred to the freight traffic department, and after successive promotions in that department, he became southern freight agent at Atlanta, Ga., in January, 1914. In 1917 he was furloughed for military duty and served as major and later as lieutenant-colonel in the transportation corps of the A. E. F. At the close of the war Mr. Franklin became president of the American Trading Company in New York, returning in 1928 to the service of the Pennsylvania. On July 1 of that year he was appointed general agent at Detroit, Mich. A year later he became general superintendent of the Northwestern region of the Pennsylvania and during the latter part of 1929 he was elected president of the Detroit, Toledo & Ironton. He remained in this latter position until January, 1931, when he again returned to the Pennsylvania as assistant to vice-president, operation, which position he held at the time of his election to the presidency of the Wabash.

In assuming his new position in these times which have brought such drastic declines in railway traffic and revenues, Mr. Franklin possesses a background of experience with such problems gained during his term as president of the D. T. & I., which extended over the initial stages of the current depression. He became president of the D. T. & I. during the latter half of 1929 and relinquished the position at the beginning of the current year. He was, therefore, in charge of this property during the entire year 1930 when gross revenues dropped to $10,163,777 from a 1929 figure of $14,057,420. In the face of this drastic decline expenses were skillfully controlled so that the 1930 total was but $6,130,707, or $1,934,323 less than the 1929 expense figure of $8,065,030. Of this decline, $667,153 was represented by the drop in transportation expenses. As a result the D. T. & I. net railway operating income for 1930 was held up to $3,156,870, or $1,344,789 less than the 1929 net. The 1930 operating ratio, as compared with that of 1929, rose only 2.9 points, or from 57.4 to 60.3.

Similar problems of meeting drastic traffic and revenue changes will be encountered by Mr. Franklin on the Wabash. For the first eight months of the current year the gross revenues of this road totaled but $34,842,634 as against a gross of $42,511,078 for the first eight months of 1930. Thus, despite the drastic economies and measures of expense control consummated during the successive regimes of Mr. Taussig and Mr. Williams, the Wabash net railway operating income for the first two-thirds of 1931 was but $1,349,615, as against a comparable 1930 figure of $4,676,670 and a 1929 net for eight months of $8,770,687.

State Commissioners Meet

Federal legislation for regulation of freight and passenger highway transport favored

COMPETITION between and co-ordination of railway and highway transportation was one of the principal topics, in committee reports, addresses, discussion and resolutions, at the forty-third annual convention of the National Association of Railroad and Utilities Commissioners held at Richmond, Va., on October 20 to 23. An entire session was devoted to the subject and as a result of the meeting the association adopted resolutions which had been recommended both by its legislative committee and the special committee on motor vehicle legislation favoring federal regulation of trucks as well as passenger vehicles. This action followed shortly after the Interstate Commerce Commission had expressed its belief, in its report on the 15 per cent rate case, that motor trucks should be included in a program of regulatory legislation, and after Chairman Ezra Brainerd, Jr., of the commission, in an address, had described the need for a revision of the laws governing interstate transportation with a view to harmonizing and co-ordinating the older and the newer forms of transportation.

The resolution adopted was in the form of a general approval of the Couzens-Parker bill, with such changes as the committee might find it necessary to make or approve, and the convention had before it a redraft of that bill by John E. Benton, general solicitor, made at the direction of the executive committee of the association at a meeting in Nashville, Tenn., on August 1. This redraft extended the provisions of the bill to freight carriers and also included a change to give the Interstate Commerce Commission power to prescribe new rates to take the place of rates which have been found unreasonable.

James S. Parker, who was chairman of the House committee on interstate and foreign commerce in the last Congress, also sent an address, which was read, advocating extension of the provisions of the bill to include motor trucks, and at about the same time Chairman Couzens, of the Senate committee on interstate commerce, told newspaper men he was inclined to favor such inclusion.

The day before the convention the delegates were the guests of the Virginia Corporation Commission at the Yorktown celebration. The program for the first day included addresses of welcome by Governor Pollard, of Virginia, and Mayor Bright of Richmond, response by Hugh Williams, of the New Mexico commission, greetings from the Virginia commission by George C. Peery, an address on State vs. Federal Regulation in Abandonment Proceedings, by William G. Fullen, of the New York Transit Commission, the address by Chairman Brainerd, and the annual address of the president of the association, Harvey H. Hannah, of Tennessee. An abstract of Chairman Brainerd's address follows:

Chairman Brainerd Urges Consideration of "National Transportation"

The present difficulties of the railroads are said to be due, primarily, to two causes. First, the long continued world-wide depression which has so adversely affected trade and commerce, and, second, to competition from other agencies of transportation. The former is perhaps the more important and there can be no question that a return of prosperity would bring greatly increased traffic. The competition of water lines, pipe lines and motor vehicles must continue to affect the railways adversely. It is perhaps not too much to say that there is today a surplus of transportation available even if there were no economic depression to reduce loadings.

The Transportation Act of 1920 was enacted before motor transportation had reached any considerable proportions and the hearings and debates preceding its enactment indicate that little if any consideration was given to this form of transportation. The fact that motor transportation was not mentioned shows what important and radical changes have taken place in transportation and distribution since 1920, when the last general transportation legislation was enacted by Congress. It is apparent that with these changed and changing conditions the laws governing interstate transportation should be revised to meet current conditions. With this end in view, the commission instituted and has completed an investigation in the matter of the co-ordination of motor transportation. The commission is giving consideration to the various problems presented and will before long issue its findings with such recommendations for additional legislation as to it may seem desirable in the public welfare.

The commercial freight traffic in the United States in 1928 amounted to 615 billion ton-miles, and in 1929 to 650 billion ton-miles. The percentage of the total for 1929 produced by the various transportation agencies is as follows: Steam railroads, including Great Lakes and inland waterways, 16.3. These figures trucks, and airplanes, 3; pipe lines, 4.9; and water-borne traffic, including Great Lakes and inland waterways, 16.3. These figures are the latest obtainable, but we know that the trend in motor and airway transport has been steadily upward.

In 1928 the commission said: "Steam railroads are, and so far as now can be discerned will remain, the backbone of the national transportation system. They alone can be relied upon for mass transportation and long distance hauls of passengers and goods." No responsible authority even suggests that they can be replaced by any other transportation agency or agencies and the inability of the railroads to function efficiently will find repercussions throughout the entire economic structure of the nation, for commercial and industrial progress is almost directly in relation to the development and efficient functioning of the nation's transportation facilities. In 1921 a survey made by United States Army transportation experts disclosed that not over 3 per cent of the service of the railroads could be replaced by highway motor truck transportation and this ratio is estimated by the same authorities as not over 5 per cent at the present time. It is possible, however, that this figure could be greatly increased without creating congestion, and within a comparatively short time. In fact, the Chief of the Bureau of Public Roads of the United States Department of Agriculture has expressed the opinion that the potential capacity of the highways is 100 billion ton-miles, which would be approximately 15 per cent of the commercial freight tonnage moved in 1929 by the several transportation agencies mentioned.

I believe that the problem should be considered as one of "national transportation" rather than one of transportation agencies. It is not a question of whether any particular form of transportation shall prevail or be given advantage. Ruthless economic laws will eventually determine that, no matter what artificial impediments may be interposed to interfere with natural progress temporarily. The public interest lies in determining the most economic and efficient transportation service by whatever facilities are best adapted for that purpose. The readjustment of transportation facilities should be made with the least possible economic waste. The ideal situation would be to have every passenger and every pound of freight moved over the most economical route and by the most efficient transportation agency. Duplication and wasteful transportation would be eliminated. Railroads should be permitted to discontinue unprofitable service which can be more economically replaced by motor or other forms of transportation. Each of the several transportation agencies should be utilized to the extent and in the place where it is the most economically productive. This

can only come through experimentation, study, and vision. Dur- the past few years the railroads have either directly, through subsidiaries, or by contract with independent motor companies supplemented their rail operations by motor vehicle operations. The use of containers, container cars, demountable truck bodies with special handling machinery is a development of the past few years which bids fair to reduce appreciably congestion in terminals and release freight cars for more profitable long-distance hauling.

The carriers in their attempt to co-ordinate rail and motor service have met with certain legal and other difficulties. For instance, there are at present no provisions in federal law for the establishment of joint rates with division of earnings, for the publication of and adherence to tariff schedules or accounting practices applicable to such co-ordinated service. Definite recommendations will be made in regard to these matters in the commission's forthcoming report in the pending rail and motor transport investigation.

The main influence in transforming the world of Julius Caesar to the world of today is transportation, and the bulk of that transformation has been accomplished within the lifetime of a man now no more than seventy-five years old.

For this reason we must jealously guard what is one of our most important national possessions. It is a time of transition —rather of development in the industry, and as is always the case in anything that is developing it is a time of experimentation. Experimentation means trial and error, it means study of problems, new problems all the time, and problems in which everyone, legislators, regulatory bodies, federal and state, executives, shippers, labor and all commercial, industrial and agricultural organizations have active part and vital interest. For the solution of these problems there are required, time, study and, above all, a spirit of fairness and a disposition to make those natural compromises and accommodations upon which the common life of modern communities depend.

In our desire for faster and more flexible service, we must be careful not to destroy our existing transportation systems in which an immense amount of permanent capital is invested and which must, so far as now can be discerned, continue to carry the bulk of our basic commodities. The aim should be to harmonize and co-ordinate the newer and the older forms of transportation with the object of obtaining from each the maximum of advantage.

Mr. Hannah, in his presidential address, discussed motor vehicle legislation, saying that there must be a co-ordination of transportation agencies, both state and national, to the end that commerce may move at the lowest reasonable rates consistent with a proper return on the property devoted to public service. He said, however, that the matter of regulation of motor transportation is to a great extent regional in character.

Subsidized Competition

S. S. Wyer, consulting engineer, Columbus, Ohio, discussed the subject of motor competition in an address on "Our Dole Thinking In Transportation", giving an estimate that the total subsidies paid from the public treasuries for the support of highway and waterway transportation and the production of electricity at Muscle Shoals amounts to $1,316,000,000 a year, which he said was nearly equal to the maximum permissible return to the railroads under Section 15a. He said that while in many instances the highways built with the proceeds of bond issues will last only ten years or so, the bonds often run from 20 to 50 years, so that deficits are accumulated every year which are not met from current taxation. He also estimated that while the gasoline taxes and fees paid by motor vehicles in the form of taxation represent only about 4 per cent of the total annual cost of their operation, to completely offset the subsidy paid by the taxpayers generally would require about 12 per cent of their cost of operation, and said that taxes imposed for "super-highways" in many parts of the country are having the effect of confiscating the lands of adjoining property owners.

S. A. Markel, chairman of the legislative committee of the National Association of Motor Bus Operators, took the opposite position, declaring that the motor bus is paying its share of the highway cost. He said that while the common-carrier busses represent but two-tenths of one per cent of the passenger cars using the highways, they pay 4.5 per cent of the total license fees and gasoline taxes. He said the railroads had been given exclusive rights of way largely by subsidies.

Reports of the various standing committees were presented, and, in accordance with the usual practice of the association, were generally received as information, although some of them aroused discussion from the floor.

Committee Reports

The Committee on Valuation, Fred P. Woodruff, Iowa, chairman, reviewed the principal developments in connection with the Interstate Commerce Commission's valuation and said that the past year has witnessed a substantial accord in view between the federal commission and the association concerning the Howell valuation, recapture and rate-making bill. It made the point that with the methods which the commission has felt bound to follow under the Supreme Court decisions, it now seems doubtful whether the aggregate value contemplated will ever be established as of any sufficiently recent year to be capable of use in a current general rate case. It expressed the opinion that the Howell bill in some form is likely to be again introduced at the next session of Congress and said that the association, through its representatives, will seek opportunity to be heard.

The Committee on Safety of Operation, Harry Bacharach, of New Jersey, chairman, after a review of grade crossing accident statistics, recommended adoption of a resolution proposing a check observation in each state, either by the state commission or the railroads, relative to the manner of automobiles passing over highway grade crossings, as to careless or reckless driving, and violations of laws and rules of the road.

The Committee on Railroad Grade Crossings, Charles W. Hadley, Illinois, chairman, suggested that one public body in each state be vested with jurisdiction not only over grade crossings but over the railway and highway traffic over such crossings and that a campaign of education and instruction be inaugurated.

The Committee on Railroad Rates, Paul A. Walker, Oklahoma, chairman, reviewed the proceedings before the Interstate Commerce Commission in the 15 per cent case, saying that this was the first instance in which the carriers had placed such supreme reliance on Section 15a that they were willing to withhold traffic testimony. He also said that the security holders in this case had taken the role of the aggressor and had occupied with their testimony a larger part of the record than did the carriers.

The Committee on Motor Vehicle Transportation, Amos A. Betts, Arizona, chairman, said that it was a pathetic commentary on Congress that this subject should have been almost wholly ignored throughout the period of the development of the motor vehicle but that the ultimate solution would be found in wise regulation that would give ample protection to the shipping public and at the same time exert a measure of control over rail and motor carriers which would preserve for each a sufficient tonnage to assure continuance of the two methods of transportation. Lack of regulation, the report said, has resulted in a multiplicity of service, and duplication of investment and overhead expenses which, in the final analysis, has to be paid by the shippers.

The Special Committee on Motor Vehicle Legislation, J. E. Benton, general solicitor of the association, chairman, said that in his redraft of the bill the paragraph which was amended by the Senate committee in such fashion as to forbid the consolidation privilege to any railroad-owned motor carrier, had been so framed as to prevent the use of the paragraph for the consolidation of railroads, which some Senators had feared might be possible under it, while giving to railroad-owned motor carriers the same right to consolidate, with Commission approval, as is given to other carriers.

The Committee on Intercorporate Relations, J. F. Shaughnessy, Nevada, chairman, recommended that each state determine for itself what additional power or control it may need to exercise over holding companies within their respective commonwealths. The committee's review of the subject, it said, fails to disclose the necessity for drastic changes in legislation with respect to holding companies.

The Special Committee on Air Transportation, Fay Harding, North Dakota, chairman, stressed the importance and necessity of uniformity in state, federal and international law and rules governing aviation but recommended no specific changes in the state laws. There were also reports from the committees on Cooperation between Federal and State Commissions, Railroad Service, Accommodations and Claims, Statistics and Accounts of Railroad Companies, I.C.C. Classification of Accounts, Depreciation, and various other subjects pertaining particularly to utilities.

A controversy which was referred to the executive committee for consideration in executive session was aroused by a resolution proposed by Paul A. Walker, of the Oklahoma commission, that hereafter the association would, under no conditions, listen to speeches at its conventions by representatives of public utility companies. The upshot was adoption of a resolution adhering to the rule adopted at last year's convention that at least two and one-half days be devoted to the business of the association before hearing addresses by outsiders. There was also some discussion of the idea of confining future conventions to Washington, to avoid the entertainment features of programs outside of Washington, but apparently the only result was the cancellation of a plan to inspect the plant of the local telephone company.

Addresses were presented on "The Rights of the States", by Frank P. Morgan, of the Alabama commission; "The State Commissions and The Federal Courts" by C. L. Seavey, of the California commission; "The New Bus Law of New York", by George R. Van Namee, of the New York commission; "Some Casual Observations Concerning Regulation", by James S. Benn, former member of the Pennsylvania commission; and by Claude L. Draper, of the Federal Power Commission; Dr. W. M. W. Splawn, of American University; Paul S. Clapp, National Electric Light Association; Alexander Forward, of the American Gas Association; D. W. Russell, of the Fargo Motor Corporation; and W. L. Stanley, vice-president, Seaboard Air Line.

John J. Murphy, of the South Dakota commission, was elected president for the ensuing year; Hugh Williams, of the New Mexico commission, was elected first vice-president; and J. P. Kuhn, of the Illinois commission, was elected second vice-president. J. E. Benton, general solicitor, James B. Walker, secretary, and Clyde S. Bailey, assistant secretary and assistant general solicitor, were re-elected. It was voted to hold the next annual meeting at Hot springs, Ark.

Detroit Hearing on Operating Practices

(Continued from page 672)

replied in the affirmative, adding that a requirement that a charge be made for such service would be unwelcome. Where the Ann Arbor absorbs a switching charge, he said, it gets a road-haul and is glad to pay the charge. From the railroad standpoint and also from that of shippers, cancellation of existing switching rules would be unfortunate, in Mr. Bradley's opinion. He said that the Ann Arbor would be put at a disadvantage if it were unable to compete for traffic originating on connecting lines.

Mr. Bradley could give the commission no information as to the aggregate amount of switching charges absorbed in a year. He said that it is impossible to lay down a universal rule to cover absorption of switching charges, and he concluded with the comment that he could conceive of no good which would arise from a change in existing arrangements which would prevent the Ann Arbor from soliciting the traffic originating on connecting lines.

Detroit & Mackinac

The Detroit & Mackinac was the next railroad represented. A. S. Madison, traffic manager, testified that there are no industries on the line to which switching allowances are made, and that switching charges are absorbed on competitive traffic only. Mr. Hagerty asked him if, in general, "reciprocal" switching rates are the same as "industrial" switching charges. Mr. Madison replied in the affirmative, and in response to another question, said that he knew no reason why they should be different. C. A. Pinkerton, general superintendent, testified that there are a few plants on the Detroit & Mackinac which do their own switching, the railroad completing delivery when it places cars on the interchange track. He added that the railroad could effect the spotting of the cars in these plants and would be willing to do so, but that the shippers prefer to do their own intra-plant switching.

J. P. Main, general manager, was the first witness for the Detroit & Toledo Shore Line. He mentioned three industries where deliveries are completed by placement of cars on the interchange track, the plants doing their own switching and receiving no allowance from the railway. In one case, the railroad cannot complete the switching; in the other two, the plants prefer to do their own switching, although the railroad is physically able to do it. Mr. Hagerty asked about the cost of operating a switching locomotive— a question which he put also to other witnesses. Mr. Main gave the out-of-pocket cost as $7.78 an hour.

F. S. Ross, general freight agent of the Detroit & Toledo Shore Line, testified, in response to a question from Mr. Burchmore, that shippers would not benefit from a cancellation of switching arrangements now in effect, and he added that they would object to such a move. Mr. Gwynn asked Mr. Ross' opinion as to whether switching charges should be compensatory, but the latter would express no opinion. Mr. Burchmore elicited testimony to the effect that it is not merely competition which controls present switching movements. Mentioning the possibility of government ownership of the railways and the elimination of the competitive factor, he asked if the existing switching movements would largely be continued. Mr. Ross answered in the

affirmative. Mr. Hagerty went into this point further and got an admission that some switching and switching charge absorptions are based on competition.

D. B. Cohan, superintendent of the Detroit Terminal, testified that no switching allowances are made to any industry. An extended discussion ensued when Mr. Hagerty asked why there should be a difference in reciprocal switching rates and industrial switching charges. Mr. Cohan replied that the reciprocal switching charge on road-haul freight is lower because the Detroit Terminal receives a reclaim on per diem of 4.3 days per car, which is not the case with respect to cars handled in industrial switching.

Grand Trunk Western Testimony

More than a day was required for the presentation of testimony of representatives of the Grand Trunk Western. The testimony was frequently interrupted by exchanges between Mr. Burchmore and Mr. Hagerty, the former insisting that shippers be given a clearer picture of what is involved in the hearings. In an off-the-record reply, Mr. Hagerty stated the opinion that millions of dollars are being dissipated annually out of railway revenues as a result of terminal service practices in effect. He said that the intent of the investigation is to determine whether the carriers are providing service to suit the convenience of shippers or to suit their own convenience. The intent, he added, is not to uncover vicious practices but simply to obtain a general and accurate picture of all practices, good or bad. He concluded that when these preliminary hearings have been completed, further hearings may be necessary. In that event, counsel for shippers will be fully advised of the points at issue. This statement seemed to clear the air somewhat.

A general statement concerning the terminal services provided by the Grand Trunk Western was presented by W. R. Davidson, assistant general manager. He was followed by the division and terminal superintendents who filed exhibits showing the industries on their respective divisions and the number of industrial sidetracks owned by each. In reply to questions put to him by Mr. Hagerty, W. R. Hogan, superintendent of the Chicago division, testified that the G. T. W. spots cars on shippers' sidings for loading and unloading, that it has no locomotives assigned to only one plant, and that there is only one instance on the Chicago division of a shipper which spots its own cars. No allowance is made in this case. At the Reo plant in Lansing, Mich., the Michigan Central spots cars for the G. T. W., the latter paying the actual cost of the service.

On the Detroit Terminal division, according to E. F. Gorman, superintendent, there are few instances of shippers who spot their own cars. In one instance, the G. T. W. locomotive spots Michigan Central cars as well as G. T. W. cars, the charge for this service being $2.00 per car. Mr. Burchmore inquired about team track facilities in the Detroit district, apparently for the purpose of eliciting proof that industries with their own siding receive no different treatment and no more expensive service from the railway than that afforded to shippers utilizing team track facilities. Mr. Gorman said that there is no particular difference in the service rendered. Mr. Hagerty brought out, however, that switching to team tracks is done at the convenience of the railway, and without regard to a particular spot for each car, while switching to private sidings involves the spotting of cars at the loading and unloading points specified by shippers. A subsequent witness also testified that switching to team tracks is cheaper than switching to industrial sidings, on account of the special spotting necessary.

Only three shippers on the Detroit division do their own switching, according to Thomas King, superintendent, who next testified. The Grand Trunk Western makes an allowance of $1.14 per car to one of these shippers, but does not do so in the case of the other two. Asked why this is the case, he replied that the other shippers have not asked for an allowance, although it was brought out that the operating circumstances at the plant receiving the allowance and at that of one not receiving an allowance were quite similar.

James Cameron, general freight agent of the Grand Trunk Western, testified concerning traffic matters. He said that the railway absorbs switching charges on competitive as well as non-competitive freight. Reciprocal switching charges are less than industrial switching rates, he admitted in response to a question.

The testimony of witnesses for the Michigan Central, the Pere Marquette and the New York, Chicago & St. Louis occupied the remainder of the Detroit hearing. This will be reported in the *Railway Age* of November 7.

Short Lines Consider Railway Situation

(Continued from page 674)

ings and questions put by the commission to the witnesses, according to Mr. Cain, have indicated a belief on the part of the commission that some carriers are engaging in wasteful practices, such as permitting cars to be used for storage and absorbing the expense of many switch movements without compensation. He added that the commission seems to be trying to find if there are wasteful practices resulting from the demands of shippers which the railways feel they cannot refuse.

Concerning the prospect for legislation in the next session of Congress, Mr. Cain said that there is little likelihood of much action affecting the railroads because the time of Congress will be taken up with matters of presumably greater national significance. Among the bills mentioned by Mr. Cain as being the ones most likely to receive some consideration by the next Congress are the Couzens Consolidation bill, one to limit the activities of holding companies, and one to repeal the recapture clause of the Interstate Commerce Act.

There was extensive discussion of the recapture clause, Clarence M. Oddie, regional vice-president of the association, recommending support by the association of the effort to repeal the recapture clause. Mr. Cain spoke favorably of the bill proposed in the last session of Congress by the National Industrial Traffic League.

Mr. Robinson told of the report recently issued by the Interstate Commerce Commission regulating depreciation accounting of the railways. The members voted to have the president of the association appoint a committee, consisting principally of accountants, to consider the subject from the standpoint of the short lines.

There was lengthy discussion of the situation with respect to the consolidation of the railways. The association in the past, according to Mr. Robinson, has supported the Four-Party Plan for the consolidation of Eastern trunk lines. Mr. Robinson described the agree-

ment with the Chesapeake & Ohio and the Baltimore & Ohio, under which these roads will include in their systems the short lines allocated to them. No agreement has been made with the New York Central and the Pennsylvania. The members voted to continue, as an association, their work in support of the Four-Party Plan and also to insist that in any consolidated system, not only the short lines operating steam motive power, but also those using electric and gasoline power, be included.

All general officers of the association were re-elected, and no action was taken concerning the time and place of the next meeting. Upon the close of the business session on October 15, the members on the following day visited Mammoth Cave.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended October 17 amounted to 761,719 cars, a decrease of 2,145 cars as compared with the week before. This was a reduction of 169,386 cars as compared with the corresponding week of last year and of 423,845 cars as compared with 1929. Loading of grain and grain products, forest products, coal, coke and livestock showed some increases as compared with the preceding week but all commodity classifications showed reductions as compared with both preceding years. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

Week Ended Saturday, October 17, 1931

Districts	1931	1930	1929
Eastern	167,528	200,534	260,841
Allegheny	143,425	180,165	234,517
Pocahontas	50,641	54,946	66,898
Southern	108,084	135,230	164,271
Northwestern	101,265	129,997	177,150
Central Western	126,582	153,718	184,062
Southwestern	64,194	76,515	,,,825
Total Western Districts	292,041	360,230	459,037
Total All Roads	761,719	931,105	1,185,564
Commodities			
Grain and Grain Products	36,718	37,884	46,369
Live Stock	29,612	32,044	38,520
Coal	151,609	159,727	200,560
Coke	5,900	8,498	12,258
Forest Products	24,781	39,032	66,439
Ore	21,480	39,517	62,618
Merchandise L.C.L.	215,116	238,153	271,809
Miscellaneous	276,503	376,250	486,991
October 17	761,719	931,105	1,185,564
October 10	763,864	954,782	1,179,540
October 3	777,837	971,255	1,179,947
September 26	738,029	950,663	1,203,139
September 19	742,628	952,561	1,167,395
Cumulative total, 42 weeks	30,869,408	38,010,883	43,465,077

The freight car surplus for the week ended October 14 averaged 535,602 cars, a decrease of 8,975 cars as compared with the week before. The total included 286,876 box cars, 189,275 coal cars, 23,079 stock cars and 10,357 refrigerator cars.

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended October 17 totaled 55,859 cars, a decrease of 2,279 cars from the previous week and a decrease of 9,137 cars from the same week last year.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
October 17, 1931	55,859	22,509
October 10, 1931	58,138	23,003
October 3, 1931	56,033	22,554
October 18, 1930	64,996	32,111
Cumulative Totals for Canada		
October 17, 1931	2,056,191	1,075,518
October 18, 1930	2,585,384	1,403,577
October 19, 1929	2,899,866	1,736,662

Proposed Legislation

WASHINGTON, D. C.

ALMOST everybody but Congress seems ready now for legislation to regulate highway and waterway transportation and almost everybody but the railroads has some well-defined plans for modification of railway regulatory legislation. The Interstate Commerce Commission and the National Association of Railroad and Utilities Commissioners last week went on record as favoring regulation of trucks as well as buses, and the federal commission, in its report in the 15 per cent rate case, added that what it had said as to motor vehicle regulation also applied to waterways and port-to-port rates.

In fact, the commission's suggestions for regulation of forms of transportation in competition with the railways cover a large part of the legislative program outlined in the "Declaration of Policy" adopted by the Association of Railway Executives on November 20, 1930, which was reaffirmed at its meeting in Atlantic City on October 23, except that the executives still have an open mind on the pipe-line question.

The National Industrial Traffic League has also recommended bus regulation but is not yet ready for truck regulation, but the chairmen of both House and Senate committees on interstate commerce have suggested that trucks be included in any legislation on the subject which may be taken up at the coming session of Congress.

The Interstate Commerce Commission in its rate decision also reiterated its recommended repeal of Section 15a and the recapture clause, along the lines of the substitute for the Howell bill which it proposed in a letter to the Senate Committee last January, and the N. I. T. L. and the state commissioner's organization have expressed their general approval of the plan, although the railroads have as yet announced no specific comments on it.

The railroad executives at their meeting added to their program a proposal that common carrier and contract vehicles be required to meet conditions imposed by each state into which and through which they operate. They also decided to seek legislation where necessary to enable railroads to enter into all forms of transportation on equal terms with others and adopted a resolution proposing that the federal government retire from actual operation on inland waterways within two years. It was also proposed that the recapture clause be repealed or modified to provide that any recapture shall be figured on the average of a period of years. It is understood that no attempt will be made at this session to take up amendments to the consolidation law.

It is expected that bills covering all these points and others will be introduced at the coming session of Congress and that efforts will be made to pass them, but Congress is so closely divided between the parties and there are so many controversies of a more partisan nature to be staged in the session preceding the presidential nomination and election campaigns that the proponents of the bills are not overly sanguine as to results.

Senator Couzens took occasion to get some publicity for his railroad views last week in a statement commenting on the commission's rate decision. He said he was not opposed to railroad consolidations which include provisions for the protection of the public interest and that of the employees, but thought that much could be done by pooling without consolidation. He said he thought the time had come when Congress

should fix a lump-sum valuation for rate-making purposes. He said it may be desirable to repeal the recapture provisions for the future but not retroactively and that regulation of motor transportation is a matter which requires careful consideration but that it would increase rather than reduce rates.

Roads Propose Rate Pool Be Loaned

WASHINGTON, D. C.

A COMMITTEE representing the railway executives held a preliminary conference with members of the Interstate Commerce Commission on October 28 for the purpose of obtaining a more definite understanding of its views and with a view to suggesting certain modifications of some of the proposals made by it as to a plan for pooling a freight rate increase among the roads in proportion to their deficiencies in relation to interest charges. The principle proposal to be made by the executives was that the fund proposed to be created by pooling the commission's substitute rate increases be treated as a loan fund, to be repaid by the roads receiving it, instead of as a "dole" as apparently contemplated by the commission, although the commission in its report merely referred to the fund as one to be "distributed" or "divided."

The railroads were represented at the conference by J. J. Pelley, president of the New York, New Haven & Hartford; H. A. Scandrett, president of the Chicago, Milwaukee, St. Paul & Pacific; W. R. Cole, president of the Louisville & Nashville—chairmen of the regional committees of railway executives who represented the railroads in the rate proceedings—and Alfred P. Thom, general counsel of the Association of Railway Executives. No conclusions were announced and they were to report back to the Advisory Committee of the Association of Railway Executives, which had met in Washington during the day to consider the various aspects of the pooling proposal and their presentation to the commission. A report of this committee will be made, after the conclusion of conferences with the commission, to a subsequent meeting of the association to be called at as early a date as practicable.

The conference was held pursuant to a resolution adopted at a meeting of the association at Atlantic City last week, at which careful consideration was given to the opinion and order of the commission in Ex Parte No. 103 and at which very general opposition was expressed to the idea of the commission's plan as it was understood and unless the commission should be willing to have the pool to be created from the ear-marked proceeds of the rate increase treated as a loan. Very general doubt was indicated, it is understood, as to whether the railroads would be able to agree to accept the plan otherwise. In announcing the results of the meeting, however, the executives did not mention the loan plan but said:

"They interpret the decision as a call by the commission on the railroads to help stabilize railroad credit by a co-operative and united effort, the means for which the order proposes to provide by an increase of specified rates. The method suggested by the commission contemplates the formation by the executives of a plan, to be submitted to it for its approval, to carry into effect this co-operative effort.

"In considering the plan, the executives will examine the opportunity of organizing their own agency, to administer the proceeds of the increase in rates announced by the commission in such manner as to accomplish the helpful purposes of the commission and with its approval."

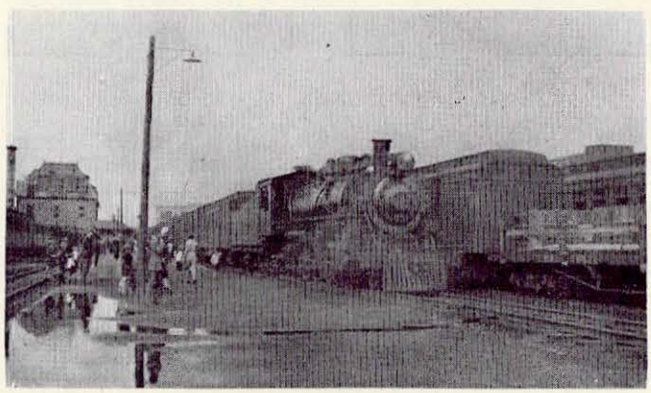
At the meeting on Wednesday consideration was given to various plans which had been formulated to carry the plan into effect. One suggestion was for the formation of a finance corporation to administer the fund, receiving the amounts from the roads and disbursing it among the roads failing to earn their interest charges in the form of interest-bearing loans to be repaid by the recipients before they pay dividends. It was understood that the first conference with the commission was for the purpose of sounding out its members as to various features of its proposal, which it did not formulate in detail.

Secretary McGinty of the commission had issued a statement during the day saying it was understood that the railway executives would request an informal conference relating to "the interpretation of certain provisions" of the commission's report and that "the commission is assured that at this conference it is not proposed to discuss any matter affecting the interests of the shipping public." It was understood that the latter referred to a question which had arisen as to whether it would be proper for the commission to hold an ex parte conference with the executives.

The railroad executives seemed very much disappointed with the commission's decision and particularly with its proposal that the small rate increases which the commission held in effect the traffic would bear should not be retained by the railroads that carried the freight.

Grenville Clark and Charles E. Hughes, Jr., counsel for the savings banks, insurance companies and other security holders in the rate advance case before the commission, called at the White House on Tuesday and in conference with Secretary Walter Newton sought White House views on possible railroad legislation to be asked of Congress at the next session. Secretary Newton was formerly a member of the House committee on interstate and foreign commerce and took an especial interest in matters of railway legislation. Later the two lawyers held a long conference with members of Division 7 of the Interstate Commerce Commission, but neither they nor the commissioners would tell what was discussed.

* * *



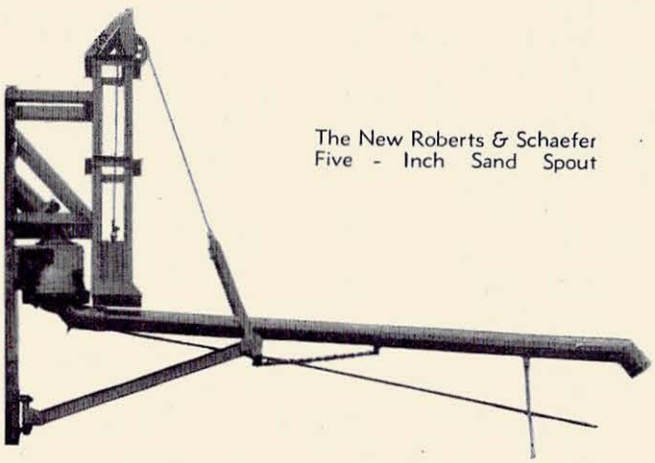
Westbound Express Train Ready to Leave St. John's, Newfoundland Government Railways

The 3-ft. 6-in. gage Government Railways operate express passenger trains across Newfoundland, between St. John's and Port-aux-Basques, three times weekly. The distance is 547.22 miles and the running time is about 27 hr. 30 min. westbound and 28 hr. 15 min. eastbound. At the left of the picture above is the St. John's passenger station, while the locomotive, of the 2-8-2 type, was built in 1930 by the American Locomotive Company.

A Large Capacity Five-Inch Sand Valve

TO meet the necessity for sanding locomotives in the shortest possible time, the Roberts & Schaefer Co., Chicago, has developed a large capacity five-inch locomotive sand valve which is said to have a capacity three times greater than the usual three-inch valves. It is reported that during actual tests 35 cu. ft. of dry sand was delivered through the new 5-in. valve in 3 min.

The new spout may be moved horizontally through an angle of from 30 to 40 deg. from the center line, thereby eliminating the necessity of exercising great



The New Roberts & Schaefer Five - Inch Sand Spout

accuracy in the spotting of locomotives. This movement of the spout is accomplished by means of hand grips on each side near its end. When released, the spout returns to its normal position at right angles to the track.

A rod reaching from the sand valve to the end of the spout operates the valve without the aid of swinging counterweights, which is a desirable feature from the standpoint of safety. The operator pulls the spout down into the operating position and pushes the rod which opens the valve. When released, the rod acts as a counterweight and closes the valve. When the sanding operation is completed, the spout is pushed up to clear the track and stops in its normal position when the balancing counterweight comes to rest at the bottom of the protecting cage. When in the raised position, the spout is telescoped into its shortest dimension by means of a chain attached to the lever roller.

THE PENNSYLVANIA moved nearly 300,000 carloads of perishable produce over its lines this year, the season topping by almost 10 per cent the record of last year. From the Del-Mar-Va peninsula, 17,000 carloads of white potatoes were shipped, and it was not an unusual sight to see solid trains of 120 carloads of white potatoes moving northward.

THE NEW QUICK FREEZING PROCESS of refrigeration is now in use for the preservation of salmon and halibut but the fisheries in Alaska, and the Canadian National reports the transportation of fish, thus treated, across the continent in its freight cars. The fish is brought down to a temperature of 20 deg. below zero and is then moved from Prince Rupert, B. C., (the western terminus of the Canadian National) to Groton (New London), Conn., in about 11 days.

Odds and Ends . . .

"Ask to postpone new edible livestock rates."—Headline in Chicago Journal of Commerce.

There seems to be no fear that they will spoil.

Soo Line Employees Get "Stage Struck"

Ten members of the Employees' Association of the Minneapolis, St. Paul & Sault Ste. Marie, in Minneapolis, Minn., have formed a dramatic club, now known as The Soo Line Players. Their first production was presented to an admiring public on September 25. Forty-one officers of the Soo Line acted as patrons of the enterprise, and the first theatrical venture of the Players proved to be quite successful. Plans for future productions are now being made.

The artists who participated in the first production represented seven departments of the railroad. There were two each from the accounting, engineering and freight-claim departments, and one each from the pay-roll, mechanical, purchasing and executive departments.

A Railroad Whistle Problem

Officials of the Chicago, Milwaukee, St. Paul & Pacific railroad are contemplating calling a musical genius to decide a problem of railroading. They are faced with the delicate task of selecting new whistles for their engines which will be penetrating enough to warn motorists and yet musical enough to soothe families living along the right of way.

Members of the Rutherford-Galewood Improvement Association and other groups said the whistles now used were so loud no one could sleep. So safety and mechanical engineers went to work. They obtained all available devices for making noises and fastening them on an old freight engine, invited every one concerned to a concert.

Musical chimes were demonstrated first, but were frowned on. A tenor whistle, which went "mi-mi-mi," was next tried. Some of the women folks liked this one, but the men seemed to prefer another, which sounded something like a foghorn. —From the Chicago Daily News.

Mr. Lowell Loses a Pal

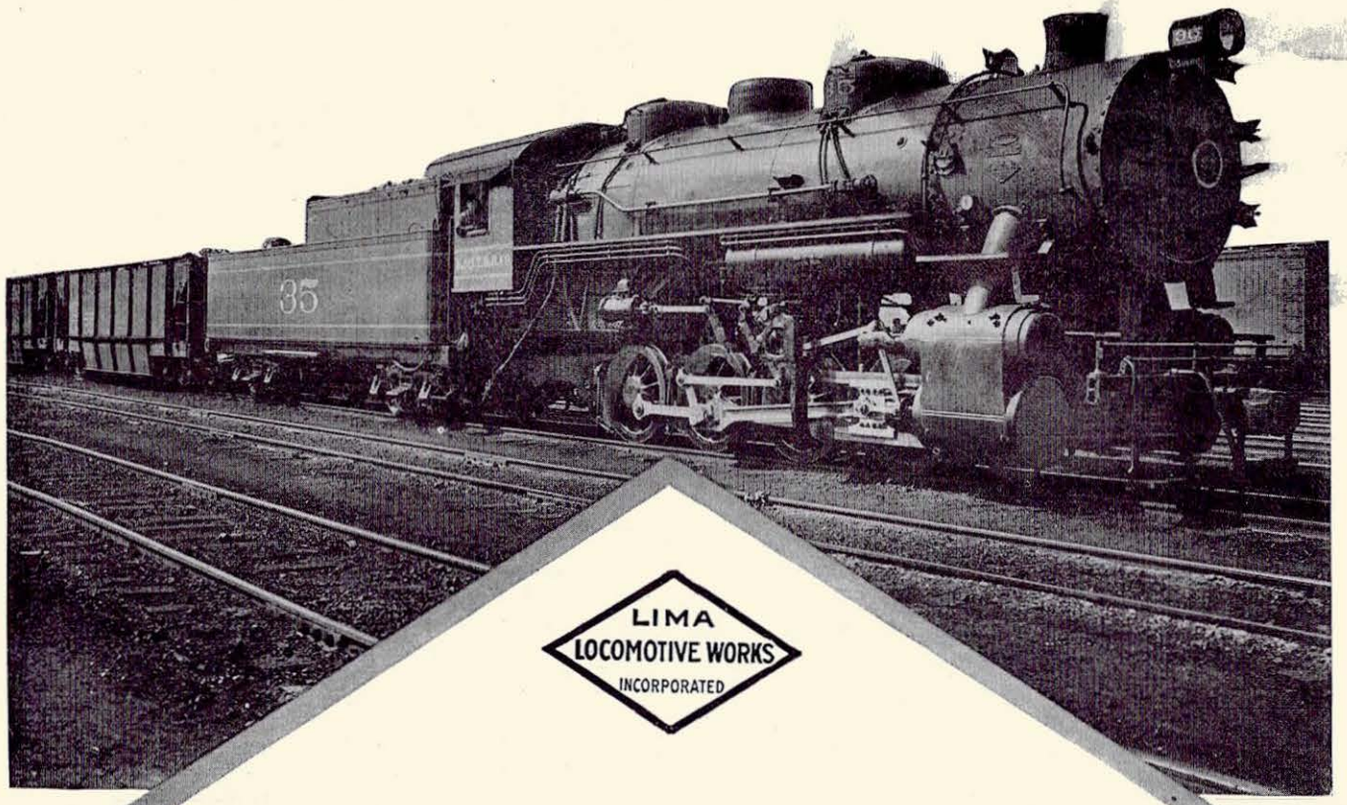
C. A. Lowell, special agent of the Iowa division, has been patrolling his territory the last few weeks with a glum countenance. His dog Turk, his constant companion for the last six years on every trip over his division, winter and summer, was killed by an automobile at Webster City, Iowa, July 27, as he was hurrying home to join his master, who was packing his grip for a trip over the division.

Turk was not "just another dog" to Special Agent Lowell. He was his constant companion, "in life the firmest friend, the first to welcome, the foremost to defend." He was the terror of box car thieves on the Iowa division. On more than one occasion, Turk commanded trespassers to get out of box cars, and after one glance at Turk, a large, black bristling bull dog, they never needed a second command.

Turk's 65 pounds of dog flesh was all but human when he started out on the gas car with Mr. Lowell over the Iowa division. Riding gave Turk great delight, if he had his goggles on. The sharp wind brought tears to his eyes, and he would look at his master and blink beseechingly until Mr. Lowell would put his goggles on. Then he would brace himself for the wind, and ride like a veteran. He would leap into a moving box car at a word from Lowell, and in a minute the car would be empty.

With the death of Turk, the Iowa Association of Chiefs of Police lost an associate member. At the annual convention of the association two years ago, when some of Turk's exploits were told, he was named an associate member.—From the Illinois Central Magazine.

News Department Begins on Next Left Hand Page



LIMA LOCOMOTIVE WORKS INCORPORATED

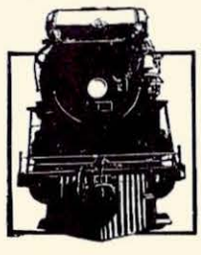
MODERN SWITCHERS REDUCE OPERATING EXPENSES

For Kentucky & Indiana Terminal

The Kentucky & Indiana Terminal have displaced twelve switching locomotives with eight modern switchers.

Consider that a quarter of all railroad mileage is made by switch engines, and the importance of operating only modern locomotives built specifically for switching service becomes apparent.

LIMA LOCOMOTIVE WORKS · INCORPORATED

LIMA  OHIO

NEWS

Multi-Class Travel Coming, Says Ogden

P. R. R. executive foresees direct delivery—Railways offering all forms of transport

George D. Ogden, New England vice-president of the Pennsylvania, addressing the Worcester (Mass.) Bond Club recently predicted that the railways would "ultimately realize that the European system of offering several distinct classes of passenger service has merits." This system, he said, "meets real needs, and is in no sense inconsistent with American institutions. We shall provide for the man who wishes to travel as cheaply as possible, and also for the one who can afford, and is willing to pay for, the super-luxuries."

"Store-door collection and delivery," he continued, "are destined to become universal. We, of the Pennsylvania, visualize the railways as the main arteries of travel and commerce, with their operations geared to heavy loads and high speeds, excelling in safety by a wide margin all other forms of transport, and serving directly only the large centers. Intermediate, local and feeder service, as well as short-distance service, is rapidly going to the highways.

"Electrification will be enormously extended, certainly to include all the densely populated areas, as well as service over heavy grades. The steam locomotive, however, is an extremely useful machine. Its complete disappearance, if that comes about at all, will be a matter of many years.

"The large railroad systems of the future will be completely integrated enterprises, serving the public by rail, highway, airway, waterway, lake and sea. Laws impeding them from so doing will be recognized as injurious, and repealed.

"Public opinion will undergo great changes with respect to the value of competition, particularly that which is artificially enforced by the so-called anti-trust laws. The rigors of the latter will surely yield to the march of progress—are visibly beginning to yield now. We shall have better, stronger and more useful railroads in the future than in the past, and the country's needs will give them more to do."

National Railway Appliances Association Abandons Exhibit

The National Railway Appliances Association decided, at a meeting of its board of directors at Chicago on October 26, to abandon its twenty-fourth annual exhibit which was scheduled to be held at the Coliseum, Chicago, on March 14-17, 1932. An annual meeting for the election of officers and the transaction of other business will be held at the office of the association on Monday, March 14.

We spend untold millions of the taxpayers' money on highways and waterways, on great public works and subsidies, all for the convenience and necessities of the public, and we let these same agencies endanger the stability of the railroads, by subjecting them to competition from airships in the air, from pipe lines underground, from government-owned barge lines on the water and from motor buses running over State-built and State-maintained rights of way. All this has threatened consequences to our future prosperity, as well as to the millions of our people whose savings are invested in the railroads, either directly or through savings banks and insurance companies.

—Governor Ritchie of Maryland in an Address at Carnegie Institute.

U. S. Court Decision on Kansas Highway Law

The United States District Court at Topeka, Kan., in a recent decision, upheld certain features, including the gross ton-mile tax, of the new Kansas motor vehicle regulatory laws, but at the same time held that those sections which establish size and weight limitations for motor vehicles are in violation of the equal protection of laws clause of the Fourteenth Amendment because of the exemption from these restrictions of vehicles engaged in the delivery of farm products to or from markets by the producer.

The case entitled Louis vs. Boynton was before the court on the motion of the defendant—Roland Boynton, attorney general of Kansas,—to dismiss the bill of complaint. In its decision the court discussed several features of the law, including the gross ton-mile tax, the regulatory provisions, the requirements for the filing of reports and the carrying of insurance and the size and weight limitations. The section exempting farm trucks and other specified classes of motor vehicles from the foregoing provisions was upheld except with reference to the specifications features. A permanent injunction against the enforcement of these latter was issued.

New Jersey Railway Taxes Confiscatory

Average $9,165 a mile—State lavishes money on highways —Motors undertaxed

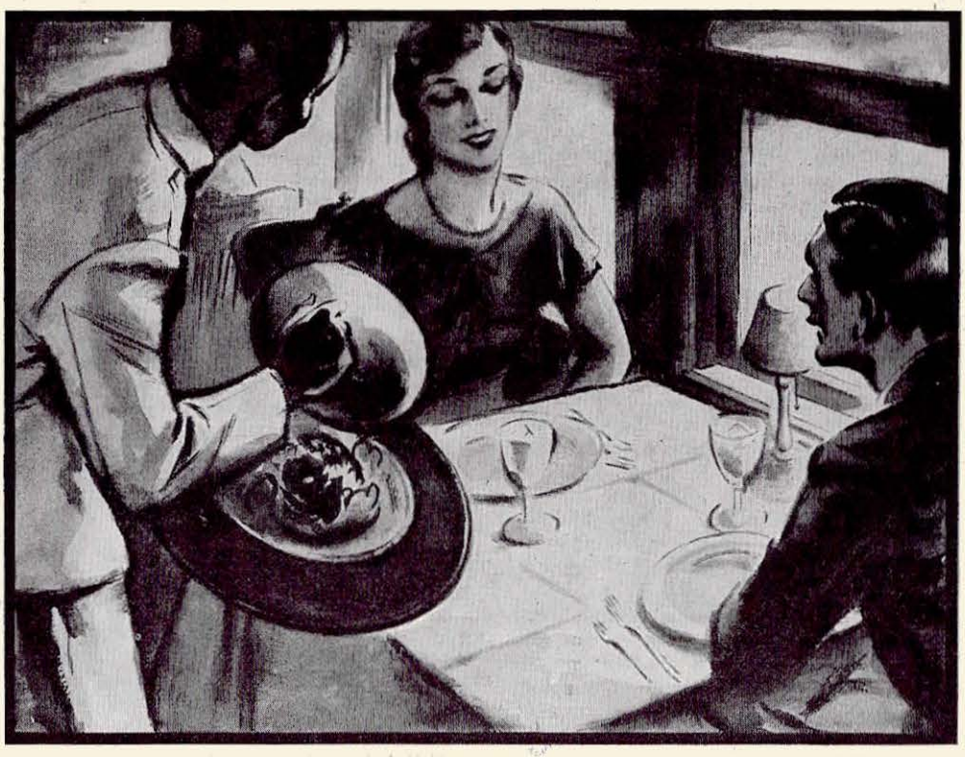
Pointing out that railroads in New Jersey are paying to the state over $20,000,000 annually in taxes—$9,165 per mile or 18 per cent of gross receipts—A. H. Elder, general solicitor of the Central of New Jersey, made an earnest appeal for relief in an address to the New Jersey State Taxpayers Association at Trenton on October 21.

"In Russia," he continued, "the state confiscates your property and assumes the responsibility of maintaining and operating it. In New Jersey today the railroads are obligated to maintain and operate their property while the state, in the form of taxation, not merely takes all the profit but under existing conditions, in the case of some of the railroads, it takes part of the capital investment."

"The practical effect of our highway policy is to grant an indirect subsidy to every commercial truck now operating in and across the state. The railroads have had to buy and construct every mile of their right of way and terminal property: they have to pay all of their costs of maintenance; and in addition they must annually pay to New Jersey taxes averaging over four per cent on the assessed value of all railroad property in the state. On the other hand, the state, counties and municipalities have constructed and are maintaining, at public expense, a system of highways directly parallel to the railroads, for which the current capital, maintenance and operating expense (not including interest on highway debt), exceeds $85,000,000 annually. How much of that enormous annual expense is contributed by motor trucks? Motor vehicles in New Jersey are exempt from personal, and the total gasoline taxes, motor vehicle registration fees and other motor vehicle receipts last year aggregated only about $27,000,000. In other words, all motor vehicles using the New Jersey highways, including private automobiles, are currently paying less than one-third of the annual public expenditures on highways.

"This means that motor traffic is making no contribution whatever for general public purposes and is paying less than one-third of the capital and other current expenditures for its right of way. Now, who is financing the other two-thirds of the annual highway expenditures? The answer is that it is being paid by home owners, rent payers, farmers, industries,

Continued on Next Left Hand Page



EASY ON THE PASSENGER

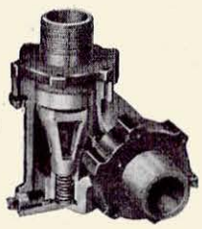
When passengers are jolted unpleasantly after every stop—remember what an easy start can be made with The Booster.

When a bad rail this winter makes you double over the hill and delay operation, think how The Booster could have avoided the trouble.

When fast passenger trains persist in running behind, recall that The Booster speeds get-a-way and saves several minutes at each stop.

Many thousand locomotives have potential power in the weight carried on trailing wheels.

Turn it into active use by hitching on The Booster. Help existing locomotives meet modern standards of operation, and be consistent with the de Luxe equipment which they haul.

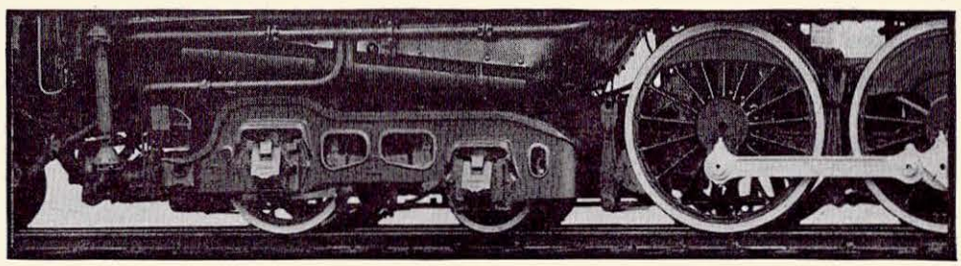


THE
FRANKLIN SLEEVE JOINT
saves gaskets, lowers maintenance

•

FRANKLIN RAILWAY SUPPLY CO.
INCORPORATED
NEW YORK CHICAGO
SAN FRANCISCO
ST. LOUIS MONTREAL

THE LOCOMOTIVE BOOSTER



railroads and other property taxpayers, partly in the form of current taxes and partly in the form of sugar-coated bond issues.

"The above figures deal with motor traffic as a whole, including 700,000 private passenger cars, in addition to the 133,000 trucks and 6,000 buses. I do not suggest that private automobiles should be taxed much higher than they are now because they are owned by the general public who are already overtaxed. My point is that the commercial trucks, which are appropriating the public highways as a place for carrying on private business, are not even paying their way. They are, as the result of oversight by our law makers, enjoying an enormous subsidy, which burdens the property taxpayer and is, most of all, unfair to their overtaxed competitors,—the railroads.

"Thirty-three of the states have a higher gasoline tax than New Jersey, and 40 of the states have higher registration fees on common carrier trucks. Moreover, many of the states, in addition to higher gasoline taxes and higher registration fees, impose personal property taxes on motor vehicles, and several other states impose a ton-mile tax on commercial trucks. When it is noted that only eight states in the Union are spending as much money on highways as New Jersey, the unfairness of New Jersey's policy to the property taxpayer as well as to the railroads becomes manifest.

"In New Jersey, the registration fee on a 3-ton common carrier truck is only $48 whereas the average fee in the 48 states is $268, and the fee in 12 of the states ranges from $400 to $900. In other words, New Jersey, in addition to favoring commercial trucks by exemption from personal property taxes and by a low gasoline tax, charges less than one-fifth the average registration fee for the country as a whole.

"I submit, that railroad taxes would be high if cut in two, and that highway taxes, especially on commercial trucks, would still be low if trebled. Railroad taxes merely reflect the excessive tax burden resting on property ownership in order to pay for the highways. As former Governor Stokes pointed out at the last convention of this Association, the obvious remedy is to 'Let the users pay for the highways.'"

S. O. Dunn Urges Co-Ordination of Transportation

The only solution of the problem of the present over-supply of transportation facilities in this country which will promote the national welfare will be the effecting of economically sound co-ordination between all our different means of transportation, said Samuel O. Dunn, editor of the *Railway Age*, in an address before the Society of Automotive Engineers at Washington on October 27.

Conference Called on Southern Grain Rate Case

The Interstate Commerce Commission has announced a conference, to which all interested parties are invited, before Examiners Mackley and Hall at Chicago, Ill., on November 5, to discuss the question of dates and places of hearing, and such other matters as may seem to require preliminary discussion, in connection with Docket 17,000, part 7-A, Grain and Grain Products To And Within Southern Territory.

Illinois Central Sells Steamship Tickets

The Illinois Central has made arrangements for selling through tickets from any place on its system to the principal ports of South America by way of ships from New Orleans, La. All-expense tours to South America also are being arranged in co-operation with steamship lines out of New Orleans. Steamship companies, likewise, will sell rail transportation over the Illinois Central from points in South America in conjunction with steamship routings.

Trainmen Spread Work on 92 Roads

The Brotherhood of Railroad Trainmen as of October 15 had reached agreement with 92 railroads whereby maximum mileage per month of men in train service and hours per month of yard men are limited in order to increase employment by distributing the available work among a larger number of men. When the Brotherhood adopted this program in May it was estimated that 41,000 train and yard men were out of work and, it is believed, this program will make regular places for 11,000 of this number with part time employment for many more.

Reduced Rail Rates Increase Cotton Movement

Car loadings of cotton in Texas have shown a substantial increase, following the 30 per cent reduction in freight rates on that commodity placed in effect in that state on October 17. Up to the time that the reduced rail rates went into effect, more than 90 per cent of the cotton from interior points to gulf ports was being carried by motor trucks. The new rates affect all of the state east of a line from Chillicothe to Big Spring, and it is planned to make a similar adjustment to cover the South Plains and the Panhandle.

Perishable Freight Investigation

A general investigation of the charges of common carriers applicable to the protection of perishable freight against heat or cold has been ordered by the Interstate Commerce Commission in an order made public on October 28, which supersedes and broadens the scope of the investigations heretofore conducted under orders issued in 1928 and makes the refrigerator car lines additional parties respondent. There have been some disputes heretofore as to the scope of the investigations which have been in progress and the new order includes as additional commodities packing-house products, dairy products, bananas and cocoanuts. It also includes stated refrigeration charges, replenishing charges, the cost of ice basis and heater service applicable under provisions of the Perishable Protective Tariff. The first hearing will be held at Los Angeles on February 8 before Examiner John L. Rogers on the stated refrigeration charges applicable on fruits, vegetables, berries and melons from points in California and Arizona, and a decision will be rendered on these charges without awaiting completion of the investigation so far as other charges are concerned.

New York Grade Crossing Program

The New York State Public Service Commission, in a hearing at Albany on October 26, listened to representatives of the principal railroads in connection with the commission's proposals for the year 1932. The New York Central presented a strong protest against having any more crossing work burdens put on its treasury at present. This road, since 1926, has completed 90 projects of this kind and the total number of projects on which the commission has issued orders involving New York Central Lines has been 378. The Pennsylvania and the Lehigh Valley also objected to going ahead with new projects at the present time.

Injunction Against Columbia Terminals Denied

United States District Judge Charles B. Davis of St. Louis, Mo., has denied the application of the Central Transfer Company, of St. Louis, for an injunction to restrain the Terminal Railroad Association of St. Louis and the Columbia Terminals Company from putting into effect a contract under which the Columbia company is given authority to handle the freight trucking between on-track and off-track stations in St. Louis and East St. Louis. This dissolves a temporary restraining order issued by Judge Otis at Kansas City on August 24. The contract becomes effective on November 1.

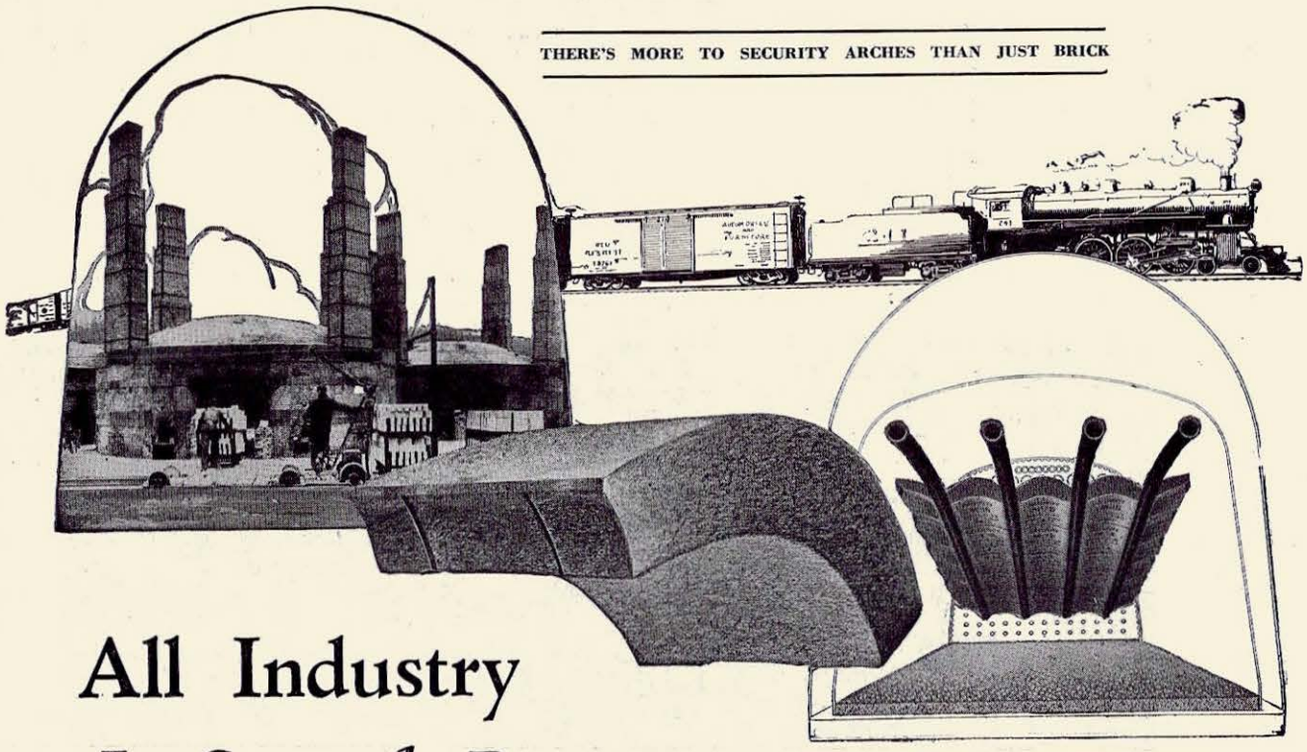
Reduction of Fares on B. & M.

The Boston & Maine, with a view to seeing if the better safety, comfort and speed on its passenger trains—as compared with automobiles—will bring back some of its lost passenger traffic, has reduced the round-trip fare between Boston and Lawrence, Lowell and Andover to one dollar, as compared with the present round-trip rates of from $1.66 to $1.88. Proportionate reductions will be made to Haverhill and North Andover. These rates are available on all trains every day. If the experiment is successful, reductions to other points are contemplated. In the territory referred to, there are on the principal lines 20 or more trains each way daily, except Sunday.

Supreme Court to Review Grain Rate Case

The Supreme Court of the United States on October 26 issued a finding of probable jurisdiction to warrant a review of the decision of the federal court at Chicago in July in which it declined to issue an injunction to restrain the Interstate Commerce Commission

Continued on Second Left Hand Page



All Industry *Is Served By* AMERICAN ARCH COMPANY

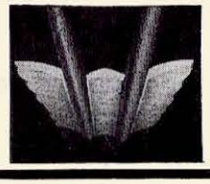
THE wealth of combustion experience that has been accumulated during 21 years by American Arch Company is being drawn upon by a variety of industries.

American Arch Company suspended furnace roofs are in every leading steel plant in the country. Oil still Arches and air-cooled side walls by American Arch Company are used in the largest oil refineries. Many prominent power plants have sectionally supported side walls and Arches designed by American Arch Company.

These and many other industries have come to American Arch Company for roofs, walls and Arches.

Yet, engineering and design is only one of the elements of American Arch Company service that has made it the accepted source of Arch Brick supply.

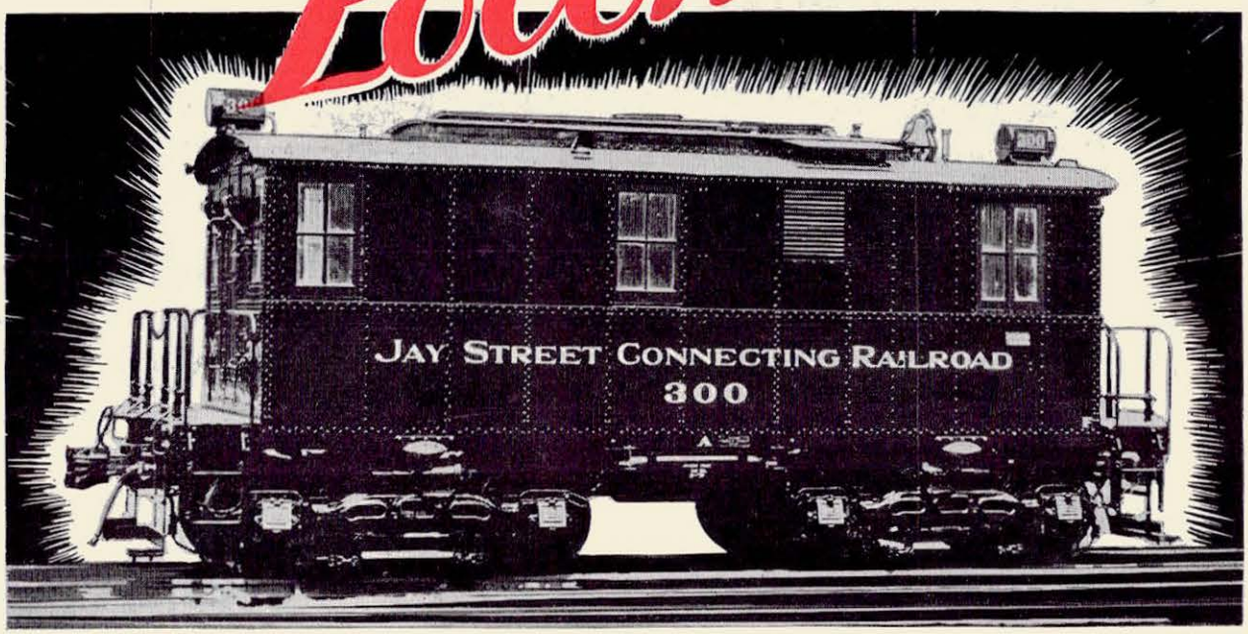
HARBISON-WALKER REFRACTORIES CO.
Refractory Specialists

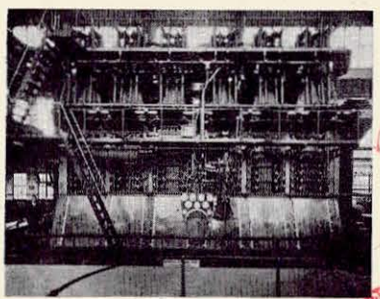


AMERICAN ARCH CO.
INCORPORATED
Locomotive Combustion Specialists » » »

Introducing

Diesel Locomotives





Let us submit cost and performance data

THE fitness and economy of the McIntosh & Seymour Diesel Engines have been thoroughly demonstrated in many industries.

In marine service, their dependability and sustained high operating economy are proven by countless ship performances.

In many municipal electric power and water plants, McIntosh & Seymour Diesel Engines are earning enough to pay most of the civic expenses. In one instance a city has been made tax-free for three years and a big surplus has been placed into its treasury.

In oil pipe line pumping, where pumps must be driven 24 hours a day for months without shutdown, the assured continuity of operation of McIntosh & Seymour Engines has been largely responsible for the steady transition from Steam to Diesel Power. Recent pumping station orders include 24 - 300 B. H. P. units for Gulf Pipe Line Company and 15 - 500 B. H. P. units for Ajax Pipe Line Company. One pipe line company installed 31 units in 1929—another operates 59 units, some of which have been in steady service since 1916.

The prominence of McIntosh & Seymour Engines in the above fields is largely due to the following outstanding qualities:

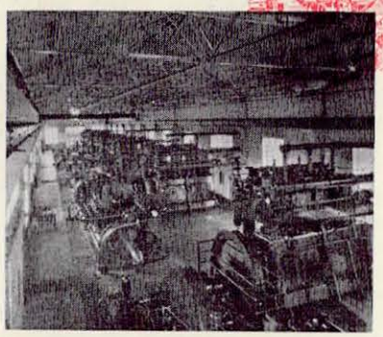
Sustained high thermal efficiency
Instant Starting
No stand-by losses
Low cost for fuel consumed
Assured continuity of service
Full capacity without time loss
Smokeless and Odorless

AMERICAN LOCOM

30 CHURCH STREET

the ALCO . . . . .

AND now this same organization has developed the Alco Type Diesel Railway Engine which in the Alco Diesel Locomotive combines these general features with the following further essentials and advantages necessary for efficient railway service.



Light weight and yet sufficient ruggedness to stand up indefinitely in railway service.

Very high tractive effort for starting and steep grades. Full power is developed at all speeds.

Quick acceleration, as the whole locomotive weight is available in starting.

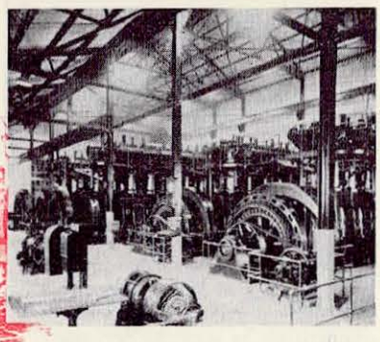
High mileage on each fueling. Stops for water are practically eliminated.

High economy even on short light traffic runs because of low fuel and operating costs.

Complete, safe and comfortable control.

Fixed parts are rugged and indestructible.

Ease of maintenance.



Alco Type Diesel Locomotives, now available in 300 and 600 HP units, are the product of the American Locomotive Company, an organization that has been identified with railway progress since railways were new. They have been designed particularly for railroad men and railroad service. When operated within our recommended range of load and use factors, they will effect substantial reductions in operating expenses.

OTIVE COMPANY

NEW YORK, N. Y.

from putting into effect its downward revision of western grain rates. The rates, which the roads estimated would reduce their revenues by $20,000,000 a year, were put into effect on August 1, and the railroads took an appeal to the Supreme Court. The case involves the question of the duty of the commission under Section 15a of the interstate commerce act.

Rivers and Harbors Congress

The official call for the twenty-seventh convention of the National Rivers and Harbors Congress, to be held at Washington on December 8 and 9, lists among the subjects for consideration the following questions: Should the convention advocate the passage of another rivers and harbors bill at the coming session of Congress? Should the convention favor the repeal of the Panama canal act? Should the convention favor or oppose giving the Interstate Commerce Commission complete control of water transportation and of highway transportation? Should the convention approve or condemn co-ordination, under common ownership, of transport by rail, by highway, by water and by air?

Committee to Survey Government Competition with Business

A special committee of business men and economists to make a survey of the forms and extent of government competition with private business has been appointed by the Chamber of Commerce of the United States, in accordance with a resolution adopted by the Chamber at its last annual meeting. The resolution proposed a "continuous and aggressive effort to have the government withdraw from existing competition as soon as necessary preparation and adjustment can be made, and against the government entering upon further competition in any field." Data has been received from member organizations of the National Chamber concerning numerous specific instances of government competition. This is now being compiled for the use of the committee.

Great Western and Soo Not Entitled to Differential Passenger Fares

A finding that the Chicago Great Western and the Minneapolis, St. Paul & Sault Ste. Marie are not entitled to a differential under passenger fares of competing lines between Chicago, Ill., and Minneapolis, St. Paul and Rochester, Minn., has been issued by the Interstate Commerce Commission in a report by Commissioner Aitchison on protests made by the competing lines against tariffs filed by the two roads proposing to establish a round-trip passenger coach fare of $15 and a round-trip fare of $18 between Chicago and the Twin Cities good in Pullman and parlor cars. The tariff was suspended and it was agreed by the parties that the commission should proceed to a determination of the question whether the two roads were entitled to maintain differential fares permanently. The regular round-trip rate is $29.32, equal to the standard rate of 3.6 cents per mile each way for a distance of 415.5 miles.

The request of the Great Western for a differential was based chiefly on its infrequent service, slow schedules, and inferiority of its equipment and service between those points but the report says the conclusion is inescapable that it is from its rail competitors that it will secure the greater part of the traffic it hopes to attract to its line. The protestants, upon their part, announced their intention to meet any cut made by the respondents and, the report says:

"None of these carriers, it appears, is in a position to absorb such a needless loss in revenue. Nor is there any reason to believe that the policy of the carriers before us would prevent the cutting of rates from spreading generally throughout the West."

Short-Haul Iron and Steel Rates Authorized

After several months of delay the Interstate Commerce Commission has authorized the eastern railroads to put into effect on November 10 reduced rates on iron and steel articles for hauls up to 100 miles, considerably less than the rates prescribed by the commission in its iron and steel revision and intended to meet the rates prescribed by the Pennsylvania commission for intrastate business. The delays have been caused by difficulties in complying with the commission's requirements as to fourth section relief and the commission has issued several supplemental fourth section orders intended to meet the situation. The new scale begins at three cents per hundred for five miles or less whereas the commission scale begins at six cents.

Real and Hidden Costs of Highway Transport

If we load the railroads with expenses which we do not load upon their competitors the railroads have got to charge enough to meet these expenses; their competitors do not have to make such a charge, and the result is that the apparent cost of the two services is not the true cost, and we may be led into adoption of the more costly means of transportation under the impression that it is the cheaper. If automotive traffic continues to increase, still more highways will have to be built. In so far as transportation is done by trucks which can be better or more cheaply done on the rails the burden upon the highways is increased, the congestion is made worse, and the pressure for the construction of new highways becomes greater, and all unnecessarily and unwisely. Grade crossings should be eliminated in many places as rapidly as we can afford to pay for it. The burden of such elimination should be so borne that it is not going to handicap the railroads, and obscure the real cost of transportation by rail and by truck. Unless a corresponding burden is put upon the trucks, the trucks are in a position to make a charge to the shipper which does not represent the real cost to the community of the service, and we may have traffic given to the trucks which, when the real cost is considered, can readily be more cheaply handled on the rails.

—T. N. Perkins, Chairman of the Boston & Maine, in an address to the New England Railroad Club

Club Meetings

The Southern & Southwestern Railway Club will hold its next meeting at the Ansley Hotel, Atlanta, Ga., on Thursday, November 19, at 10 a.m. W. M. Sheehan, General Steel Castings Corporation, will present a paper on cast steel foundations for railway equipment. The election of officers will take place at this meeting.

The Cincinnati (Ohio) Railway Club will hold its next meeting on Tuesday evening, November 10. This will be the annual dinner and also the club's first "Ladies Night." The annual election of officers will take place, and there will be a musical entertainment by employees of the Baltimore & Ohio.

The Car Foremen's Association of Chicago will hold its next meeting on Monday evening, November 9, at the Auditorium Hotel, Chicago. A. W. Berger, assistant master car builder, Chicago & North Western, will present a paper on terminal preparation of passenger trains.

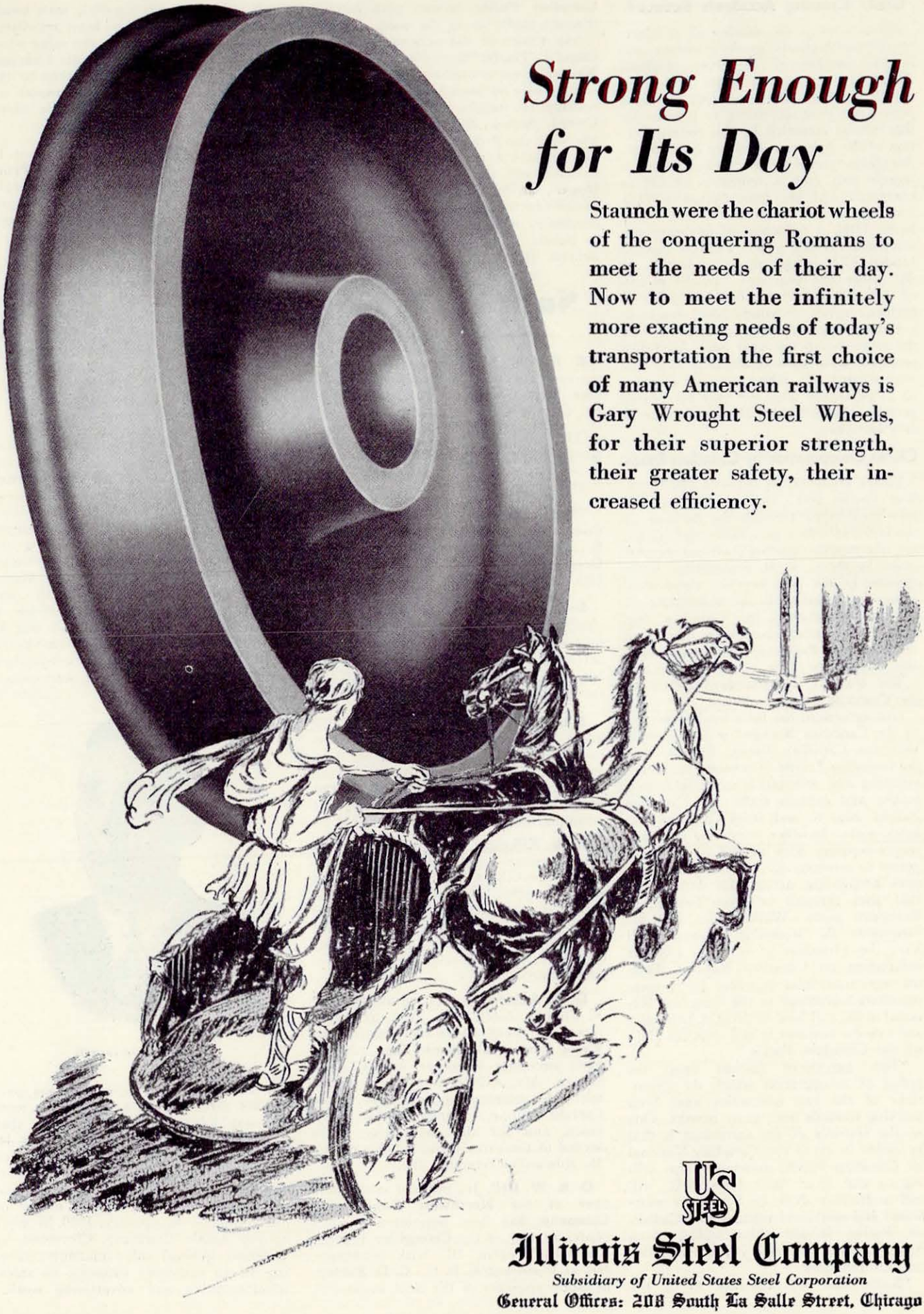
Robberies Increasing

Robberies on Class I railroads of the United States increased 14 per cent during the first half of 1931, as compared with the last half of 1930, the loss amounting to $579,398 as compared with $508,146. The claims paid on stolen freight amounted to .035 per cent of the gross freight revenue, as compared with .025 per cent during the last half of 1930. Payments for four half years have been:

	Entire Package	Other	Total	Per Cent Increase	Per Cent of Gross Freight Revenue
1929—Last Half	$221,397	$126,303	$347,700	...	.014
1930—First Half	311,370	170,739	482,109	38.6	.023
1930—Last Half	353,162	154,984	508,146	5.4	.025
1931—First Half	398,149	181,249	579,398	14.0	.035

In 1920, the losses sustained by the railroads included $12,726,000 for robberies; in 1929 only $757,803, equivalent to a decrease of 94 per cent. The decrease in business and forces, together with the corresponding increase in the number of unemployed persons, has no doubt had a material bearing, on the increase, since 1928, in robbery losses.

Continued on Next Left Hand Page



Strong Enough for Its Day

Staunch were the chariot wheels of the conquering Romans to meet the needs of their day. Now to meet the infinitely more exacting needs of today's transportation the first choice of many American railways is Gary Wrought Steel Wheels, for their superior strength, their greater safety, their increased efficiency.

US STEEL

Illinois Steel Company

Subsidiary of United States Steel Corporation

General Offices: 208 South La Salle Street, Chicago

Grade Crossing Accidents Reduced

Reductions in the number of accidents at railroad-highway grade crossings and in the number of casualties resulting therefrom were shown in the first seven months of 1931, compared with the same period last year, according to reports for that period compiled by the Safety Section of the American Railway Association. Accidents totaled 2,393 for the first seven months this year, a reduction of 238 as compared with the same period in 1930. Fatalities caused by such accidents numbered 1,044, a reduction of 62 below the same months last year. Persons injured totaled 2,722, which was a reduction of 282 under one year ago. In the month of July alone, 279 accidents at railroad-highway grade crossings were reported, a reduction of 17 under the number for the same month one year ago. Fatalities resulting from such accidents in July this year totaled 123, which was a reduction of 21 compared with one year ago, while persons injured totaled 319, the same as in July last year.

Closer Co-operation by Canadian Roads

Closer co-operation between the Canadian Pacific and Canadian National has been established through the decision of the latter to solicit passengers and freight for the vessels operated across the Atlantic by the C. P. R. Steamships. Competition in the past between these companies has resulted in the negotiation of agreements between the Canadian National and steamship companies other than the Canadian Pacific to solicit passengers and freight for their respective services.

The text of the statement issued by the Canadian Pacific follows:

"An agreement has been reached whereby the Canadian National will co-operate with the Canadian Pacific Railway and the Canadian Pacific Steamships in the advertising and solicitation of freight, passenger and express traffic for Canadian Pacific ships to and from Canadian Atlantic ports. In other words the two railway companies have agreed to work together to promote rail and steamship business originating across the Atlantic or that goes through or from Canada to European ports. While under this arrangement the steamship company will have the advantage of securing business originating on Canadian National lines, the agreement also provides for a compensating advantage to the Canadian National in the rail haul of freight, passenger and express business to and from the ships of the Canadian Pacific.

"This agreement follows upon the policy of co-operation which the executives of the two companies have been working towards over many months. One of the features of the agreement is that in order to serve the Canadian National all Canadian Pacific passenger ships sailing to and from Saint John, N.B., will call at Halifax, N.S., on both their westbound and eastbound voyages, and Canadian Pacific freight ships sailing from Saint John on eastbound voyages will also put into that port.

"Saint John will continue to be the Canadian Pacific winter port handling through traffic as in the past.

"As a part of the agreement with the Canadian Pacific Steamships the Canadian National representatives become agents for the sale of passenger tickets and the booking of freight through Canada, the United States, the British Isles and wherever else it does business. The agreement covers a period of ten years, and has received the signatures of E. W. Beatty and Sir Henry Thornton. It becomes effective at once. The two railway companies will, as in the past, continue to handle traffic to and from all other Atlantic steamship lines."

Supply Trade

E. R. Dougherty has been appointed representative of the **American Manganese Steel Company,** Chicago Heights, Ill., for the Chicago district.

The Shepard Niles Crane & Hoist Corporation, Montour Falls, N. Y., has moved its office from the People's Gas building to 564 West Monroe street.

The Charles R. McCormick Lumber Company of Delaware and the **Charles R. McCormick Lumber Company of Oregon** have moved their offices to the McCormick Terminal, Portland, Ore.

Robert S. Binkerd, formerly vice-chairman of the Eastern Railroads' Committee on Public Relations and latterly active in financial circles in New York, has been appointed director of sales of the **Baldwin Locomotive Works.**

Harry S. Sleicher, formerly vice-president of the North American Refractories Company, has severed his connection with that company and is now associated with the **General Refractories Company** in a sales capacity, with headquarters at New York.

H. W. Kilkenny, St. Louis, Mo., branch office manager of the **Ohio Brass Company,** Mansfield, Ohio, has resigned. Mr. Kilkenny, who has been actively identified with the electrical industry since 1907, is financially interested in his brother's company, the J. G. Kilkenny Company, manufacturers agents, Cleveland, Ohio.

G. B. Allison has opened an office at 50 Church street, New York, as manufacturer's agent; he is representing the **Excel Curtain Company, Inc.,** and solicits accounts of other supply companies. Mr. Allison was formerly district sales manager at New York of the Curtain Supply Company, for eight years, and for the past three years served in the same capacity with the O. M. Edwards Company, Inc.

G. A. W. Bell, Jr., railroad sales manager of the **Northwest Engineering Company,** has been appointed eastern representative of the **Caterpillar Tractor Company,** Peoria, Ill., with headquarters at Washington, D. C. **C. D. Turley,** assistant engineer of the chief engineer's staff of the Illinois Central, with headquarters at Chicago, has been appointed western representative of the same company, with headquarters at Chicago. These men will devote their time to the promotion of Caterpillar equipment on the railways in their respective territories.

C. L. Schneider, who, for the past 14 years, has been connected with the **Fruehauf Trailer Company, Inc.,** Detroit, Mich., serving in various departments, including engineering and sales, has been appointed manager of the company's branch at Chicago, formerly located at 2711 S. Wabash avenue, and now at Michigan avenue and Twenty-ninth street. **Frank L. Tully,** who has been with the company since 1926, has been appointed manager of the branch at Cleveland, Ohio. He succeeds **Harry S. Moore,** for many years Cleveland branch manager, who has been promoted and will in future devote all his time to a special sales assignment.

Ralph Leavenworth has been appointed general advertising manager of the **Westinghouse Electric & Manufacturing Company,** with headquarters at East Pittsburgh, Pa. He will have charge of all advertising and publicity activities of the company, including the advertising division of the merchandising department now centered in Mansfield, Ohio. Mr. Leavenworth was graduated from Hamilton College in 1914. He was associated with the Y. M. C. A. in Cleveland for four years. After the war he joined the Standard Parts Company, Cleveland, and except

Ralph Leavenworth

for a short period when he was personnel director for a publishing firm, he was advertising manager of that company until 1923. In that year he became an accounting executive for Paul Teas, Inc., an industrial advertising agency, remaining for six years and becoming in that time part owner of the company. In January, 1930, he went to the Austin Company, Cleveland, as assistant general sales manager, serving in an executive capacity on sales, administrative and advertising work.

Continued on Next Left Hand Page

THE MARTINEZ-BENICIA BRIDGE across SUISUN BAY, CALIFORNIA

THIS bridge was completed in 1930, and was built for the Southern Pacific Railroad to carry its main line without ferry interruption from Oakland northward to Sacramento, Portland and Seattle, and eastward over the Overland Route. The structure is a double track railroad bridge 5603 feet long end to end of steelwork.

THE STEEL SUPERSTRUCTURE WAS

FURNISHED FABRICATED AND ERECTED BY

AMERICAN BRIDGE COMPANY

Subsidiary of United States Steel Corporation

MANUFACTURERS of BRIDGES, BUILDINGS

and other classes of steel structures

General Offices: Frick Building, Pittsburgh, Pa.

CONTRACTING OFFICES IN PRINCIPAL CITIES

Pacific Coast Distributor
COLUMBIA STEEL COMPANY
San Francisco, Calif.

Export Distributor
UNITED STATES STEEL PRODUCTS CO.
30 Church St., New York, N. Y.

New Simmons-Boardman Officers

As a sequel to the election of Samuel O. Dunn and Henry Lee, formerly vice-presidents, to the chairmanship and presidency, respectively, of the Simmons-Boardman Publishing Company, publishers of *Railway Age* and other railway and marine periodicals, other elections and appointments have been made as follows: Roy V. Wright, secretary of the company, has been elected vice-president and secretary; George Slate, business manager of Marine Engineering and the Boiler Maker and a director of the company, has been elected also vice-president; Elmer T. Howson, western editor of *Railway Age* and editor of Railway Engineering and Maintenance, has been elected vice-president and a director; Frederick H. Thompson, vice-president in charge of the Cleveland office has been named to the directorate; and Frederick C. Koch, manager of advertising sales of the railway publications division of the company, has been elected vice-president. The headquarters of each will continue as heretofore, i.e., Messrs. Wright, Slate and Koch at New York, Mr. Thompson at Cleveland and Mr. Howson at Chicago.

Roy V. Wright

George Slate

Elmer T. Howson

Frederick C. Koch

Roy V. Wright was born at Red Wing, Minn., on October 8, 1876, and was educated at the University of Minnesota, from which he was graduated in 1898 with the degree of M.E. He entered railway service in the same year as a machinist's apprentice on the Chicago, Milwaukee & St. Paul at South Minneapolis, Minn. Two years later he joined the staff of the Chicago Great Western as a draftsman and was later made chief draftsman. In 1901 he was appointed mechanical engineer of the Pittsburgh & Lake Erie, which office he resigned in 1904 to become associate editor of the American Engineer and Railroad Journal (now the Railway Mechanical Engineer). In the following year he became editor of that publication and continued as such until 1910, when he became mechanical department editor of the Railway Age-Gazette (now *Railway Age*). In the following year he was appointed managing editor and has since continued in that capacity. Since 1912 he has also been editor of the Railway Mechanical Engineer and of the Car Builders' Cyclopedia and the Locomotive Cyclopedia. He was elected a director of the Simmons-Boardman Publishing Company in 1915 and secretary in 1919. He is a member of the Transportation Committee and the Industrial Committee and chairman of the Board of Publications of the National Council of the Y. M. C. A. He served two terms as president of the United Engineering Society, New York, and is at the present time president of the American Society of Mechanical Engineers, in the work of which association he has long taken a prominent part. He is a member of the executive committee of the New York Railroad Club and of the advisory board of the department of

Frederick Hurd Thompson

smoke regulation of Hudson County (N.J.). Last June the degree of Doctor of Engineering, *honoris causa*, was bestowed upon him by Stevens Institute of Technology.

George Slate was born on September 27, 1874, at Oxford, Mich. He was educated in the public schools of Alma and Grand Rapids, Mich., and started his business career in the classified advertising department of the Philadelphia Press, later removing to New York where he served the New York Journal in a similar capacity. His association with Marine Engineering dates back over 30 years, he having joined the staff of that publication as an advertising salesman on October 14, 1901. He was later elected a vice-president of the Aldrich Publishing Company, which at that time published that periodical. The company in 1905 acquired The Boiler Maker and Mr. Slate's jurisdiction was extended to include that journal as well as Marine Engineering. In 1920 the Aldrich Publishing Company with its two publications was acquired by the Simmons-Boardman Publishing Company and shortly thereafter Mr. Slate was elected a director of the latter company, on which board he has since served continuously. He is an associate member of the Society of Naval Architects and Marine Engineers. He was for 15 years secretary and treasurer of the Boiler Maker Supply Men's Association and has long interested himself in the affairs of that organization and the Master Boiler Makers Association. He has also been active in the work of the Associated Business Papers, Inc., and in the business paper division of the Audit Bureau of Circulations.

Elmer T. Howson was born at Folletts, Iowa, on May 23, 1884, and was educated at the University of Wisconsin, from which he received his B.S. degree in 1906 and his C.E. degree in 1914. He entered railway service in 1903 as field draftsman for the Iowa & Illinois Railway (now the Clinton, Davenport & Muscatine). He later became an instrumentman for the same road and in 1905 went with the Chicago, Burlington & Quincy in the same capacity. From 1906 to 1909 he was a resident engineer and assistant engineer on heavy construction of the same road and from 1909 to 1911 was division engineer. In the latter year he entered the service of the Railway Age-Gazette as engineering editor and in 1919 he was appointed Western editor of the *Railway Age*, in which capacity he has since served continuously. Since 1916 he has also been editor of Railway Engineering and Maintenance and of the Railway Engineering and Maintenance Cyclopedia. He is a past president of the American Rail-

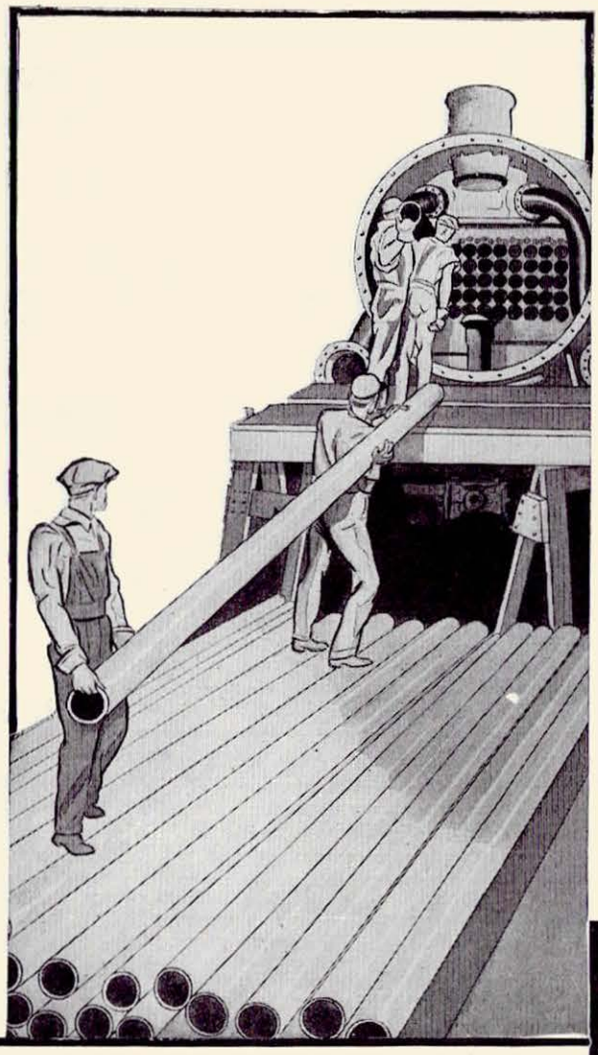
Continued on Next Left Hand Page

TONCAN

....will tame bad water

FORMERLY, when bad water went on a rampage, boiler tubes suffered and maintenance mounted high.

Now, thanks to modern metallurgy, there is a way to check the attacks of corrosive waters.



Boiler tubes of Toncan Iron have superior resistance to rust and corrosion. This alloy of refined iron, copper and molybdenum will outlast other boiler tube materials. Service records prove it.

Toncan Iron tubes not only resist corrosion and pitting but they are seamless and can be cold-worked without danger of subsequent fire-cracking.

Toncan Iron tubes are a contribution of modern metallurgy to the reduction of locomotive maintenance.

REG. U. S. PAT. OFF.
TONCAN
COPPER
Mo-lyb-den-um
IRON

REPUBLIC STEEL
CORPORATION
General Offices: Youngstown, Ohio

way Bridge and Building Association, the Western Society of Engineers, the Track Supply Association and the National Conference of Business Paper Editors. At the present time he is president of the Roadmasters' and Maintenance of Way Association, first vice-president of the American Wood-Preservers' Association, a member of the executive council of the American Association of Railroad Superintendents and a member of the executive committee of Associated Business Papers, Inc. He is a member of the Society of Civil Engineers, which he has served as chairman of its Illinois section.

Frederick H. Thompson was born in Cleveland, Ohio, on August 1, 1885. He attended the Brooks School at Cleveland and the University School and Military Institute at East Orange, N. J. He started his business career as a newspaper reporter in New York in 1902 and served for a time as dramatic critic. From 1904 to 1907 he was eastern representative of the Music Trade Review. He was business manager of the Railway Mechanical Engineer from 1912 to 1920 and was general manager for the Simmons-Boardman Publishing Company in the Central district at Cleveland, Ohio, from 1920 to 1924, since which last date he has been a vice-president of the company in charge of the Central district, with offices at Cleveland, Ohio.

Frederick C. Koch was born in Jersey City, N. J., on June 9, 1893, and was educated in the public schools of New York. He entered the employ of the Railway Age-Gazette in 1909 in a minor capacity and rose through various clerical positions to the managership of the advertising make-up department. In 1917 he became advertising sales representative for all Simmons-Boardman transportation publications with the title of assistant to vice-president. In 1925 he was appointed business manager of Railway Engineering and Maintenance and continued in that capacity until a few months ago when he was made manager of advertising sales of the railway publication division of the Simmons-Boardman Publishing Company.

OBITUARY

Nathaniel Curry, chairman of the board of the Canadian Car & Foundry Company, and a member of the Canadian Senate, died at his summer home at Tidnish, N. S., on October 23. Mr. Curry was born on March 26, 1851, in Kings county, Nova Scotia. In association with Nathaniel Rhodes, he founded Rhodes-Curry, Ltd., and was instrumental in consolidating that company with several other Canadian plants to form the Canadian Car & Foundry Company. He first served as president of the latter company, but several years ago retired from that office to become chairman of the board. Mr. Curry had spent some years in the United States in connection with railway and mining companies; he had been at various times connected with a large number of industrial concerns as president or director, and had served as a member of the Canadian Senate since 1912.

C. B. Woodworth, manager of the railroad division of the Vanadium Corporation of America, with headquarters at Chicago, died at his home on October 24. Mr. Woodworth was graduated in mechanical engineering from Purdue University in 1907 and from then until 1916 he served with the mechanical departments of the Wabash and the Baltimore & Ohio in various capacities from machinist to general foreman of the Mt. Clare shops of the B. & O. He then entered the employ of the American Arch Company, serving until 1918, when he received a commission as captain of engineers in the United States

C. B. Woodworth

Army. After a service of 15 months with the A. E. F. on railroad work in France, he returned to this country and joined the foreign sales department of the American Locomotive Company, spending six years in the Argentine and in Brazil engaged in sales and service work. In 1926 he went with the Premier Staybolt Company as special technical representative; in May of the following year he left that service to become manager of the western division of the Vanadium Corporation of America, with headquarters at Chicago, and in August, 1930, was appointed manager of the railroad division of the same company, which position he held until the time of his death.

TRADE PUBLICATIONS

STEEL SHEET PILING.—The Carnegie Steel Company, Pittsburgh, Pa., has issued a 92-page loose-leaf manual on the use of steel sheet piling that contains a fund of information of value to the designer. In addition to data on the properties of the standard and special Carnegie sections, space is given to the principles of lateral pressure as applied to sheet pile construction, while other pages are devoted to sketches and views of a variety of applications of sheet piles in construction work.

LUBRICATED PLUG COCK VALVES.—A 172-page catalog, illustrating approximately 30 types of Nordstrom lubricated plug cock valves, has just been issued by Merco Nordstrom Valve Company, 343 Sansome street, San Francisco, Cal. The catalog lists various types of valves made in different metals for handling different liquids, semi-liquids and gases, both neutral and acid. The catalog also lists steam-jacketed valves, remote-control valves and types with multi-ports, both in low and high pressure. Valves manufactured of bronze, aluminum and Mercalloy for handling corrosion-resistant liquids are also shown, and the catalog is illustrated with actual installations in approximately 20 industries.

Equipment and Supplies

FREIGHT CARS

THE ALUMINUM ORE COMPANY, East St. Louis, Ill., a subsidiary of the Aluminum Company of America, has ordered 10 all-aluminum 70-ton hopper cars from the Canton Car Company.

PASSENGER CARS

THE MISSOURI-KANSAS-TEXAS, reported in the *Railway Age* of October 10 as having ordered two gas-electric rail motor cars from the St. Louis Car Company, will equip one of these cars with a Brill Model 660 power plant, and Westinghouse electrical equipment.

IRON & STEEL

THE NEW YORK CENTRAL is inquiring for 3,000 tons of steel for grade crossing elimination work at Buffalo, N. Y.

THE BOSTON & MAINE has ordered 10,000 tons of rail for its 1932 requirements, from the Bethlehem Steel Company.

THE ATLANTIC COAST LINE has ordered 15,000 tons of 100-lb. rail from the Bethlehem Steel Company and the Tennessee Coal, Iron & Railroad Company.

THE WESTERN MARYLAND has ordered 1,000 tons of 130-lb. rail from the Bethlehem Steel Company and 1,000 tons from the Carnegie Steel Company, for delivery in November.

THE ATCHISON, TOPEKA & SANTA FE has ordered 42,500 tons of rails, placing 5,500 tons with the Illinois Steel Company, 5,500 tons with the Inland Steel Company and 31,500 tons with the Colorado Fuel & Iron Company.

Continued on Next Left Hand Page

BETTER FIRES

FIREBAR CORPORATION
CLEVELAND OHIO.

Financial

CHICAGO & EASTERN ILLINOIS.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to pledge $5,262,500 of prior lien mortgage 6 per cent bonds as collateral for short-term notes.

CHICAGO & NORTH WESTERN.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon its Beaver branch extending from Beaver, Mich., west and northwest a distance of 14.6 miles.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon a line extending from Velasco, Wisc., northerly to a point near Boulder Junction, 16.9 miles.

DANSVILLE & MOUNT MORRIS.—*Bonds.*—The Interstate Commerce Commission has authorized this company to extend until November 1, 1941, the maturity of $150,000 of its first mortgage 5 per cent bonds due November 1 this year.

GAINESVILLE & NORTH WESTERN.—*Abandonment.*—The Interstate Commerce Commission has authorized the receivers of this company to abandon as to interstate and foreign commerce its entire line extending from New Holland Junction, Ga., to Helen, 33.6 miles, and the abandonment of operation under trackage rights over the Gainesville Midland between New Holland Junction and Gainesville, 2 miles.

ILLINOIS CENTRAL.—*Omits Dividend.*—The directors of this company have voted to omit the quarterly dividend of $1 due at this time on its common stock. This is the first time this company has passed a dividend since 1859.

LOUISIANA & ARKANSAS.—*Notes.*—The Interstate Commerce Commission has authorized this company to extend from time to time, but not later than the end of 1933, a secured promissory note for $1,700,000 which will mature on December 31 next and to pledge and repledge as collateral security therefor $2,766,000 of first mortgage 5 per cent, series A bonds at a rate of interest not exceeding 6 per cent.

NIAGARA JUNCTION.—*Acquisition.*—This company has applied to the Interstate Commerce Commission for authority to lease the property of the Niagara Gorge, which has a line from Niagara Falls, N. Y., to Lewiston, 15.6 miles.

NORFOLK & WESTERN.—*Extra Dividend.*—The directors of this company have declared the usual extra dividend of $2.

PENNSYLVANIA.—*Reduces Dividend.*—Directors of this company have declared a quarterly dividend of 50 cents on its $50-par stock. Last quarter the dividend was reduced from $1 to 75 cents. Thus the stock, formerly paying 8 per cent, now pays 4.

SEABOARD AIR LINE.—*Abandonment.*—The Receivers of this company have been authorized by the Interstate Commerce Commission to abandon that part of its Covington branch extending from Leonton, Fla., to the end thereof, 8.8 miles.

WESTERN PACIFIC.—*Bonds.*—The Interstate Commerce Commission has authorized this company to issue $645,000 of first mortgage, 5 per cent bonds, maturing in 1946 to be sold to the highest bidder at not less than 97½, which would make the average annual cost approximately 5.25 per cent.

YAZOO & MISSISSIPPI VALLEY.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon a branch line extending from Boyle, Miss., easterly to Dockery, 8.2 miles.

YREKA.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon its line from Montague, Cal., to Yreka, 7.37 miles.

Average Prices of Stocks and of Bonds

	Oct. 27	Last week	Last year
Average price of 20 representative railway stocks..	45.49	51.54	99.40
Average price of 20 representative railway bonds..	76.73	77.13	94.28

Dividends Declared

Atlanta & West Point.—2 per cent, payable December 31 to holders of record December 19.

Georgia Southern & Florida.—First Preferred Dividend Omitted.

Hudson & Manhattan.—1¾ per cent, semi-annually, payable December 1 to holders of record November 16.

International Railways of Central America.—Preferred Dividend Omitted.

Norfolk & Western.—Common, $2.50, quarterly; Common Extra, $2.00, both payable December 19 to holders of record November 30.

Reading Company.—First Preferred, 50c, quarterly, payable December 10 to holders of record December 19.

THE RAILWAY & LOCOMOTIVE HISTORICAL SOCIETY, (Boston, Mass.) has issued bulletin No. 26, a pamphlet of 56 pages, containing numerous items of interest to students of history. The principal article is one by Sidney Withington, electrical engineer of the New York, New Haven & Hartford, on the experience of that road as a pioneer in electric traction. The Nantasket Beach line of this company was the first regular railroad in the country to adopt electric traction. The article is profusely illustrated. Other articles recount some history of the locomotives of the Boston & Maine and of the locomotive manufacturing shops of Manchester, N. H. F. Gaiser, a German, who apparently has read everything that has been published about locomotives since the birth of the railroad era, contributes 15 pages of the notes which he has made; largely corrections in and additions to the writings of various authors on the locomotive history of England, Germany and America during the first 30 years of the railroad era.

Construction

ALTON.—A contract has been awarded to J. C. Mullvill, Alton, Ill., for the grading for a wye track, 2,675 ft. long, to be constructed at San Jose, Ill. All other work in connection with this project will be done by company forces.

ATCHISON, TOPEKA & SANTA FE.—This road expects to ask for bids in the near future for the construction of its new passenger and express station at Oklahoma City, Okla., which is being undertaken as a part of the Santa Fe's general plan of track elevation at that point. The new structure, which is to be located at the intersection of California and Santa Fe avenues, will have dimensions of 104 ft. by 386 ft. and will be of reinforced concrete and steel construction. It will have one and two stories and a basement.

CHICAGO, BURLINGTON & QUINCY.—A contract has been awarded to G. A. Johnson & Son, Chicago, for the construction of a new coach shop, 212 ft. by 311 ft., at Aurora, Ill., to replace the structure recently destroyed by fire. The new building will be of brick, concrete and steel construction.

DELAWARE & HUDSON.—This company has awarded to the American Pipe & Construction Company, Philadelphia, Pa., a contract for the elimination of Wing's crossing, Plattsburg, N. Y., at a probable cost of $81,500.

GALVESTON, HOUSTON & HENDERSON.—This road contemplates the construction of an underpass to carry Seventy-Fifth street under its single-track line at the entrance to Mason park, Houston, Tex. The structure, which will provide for four traffic lanes, will be of reinforced concrete construction and will have a center pier. This project has an estimated cost of $25,000.

OREGON ELECTRIC.—This company has applied to the Interstate Commerce Commission for authority to construct a 7-mile extension from Forest Grove, Ore., to the millsite of the Stimson Lumber Company.

THE CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA has been granted permission by the Railroad and Warehouse Commission of Minnesota to discontinue trains Nos. 70 and 71 between Heron Lake and Pipestone, 55 miles, and trains Nos. 7 and 8 between Mankato and Fairmount, 94 miles. According to the railroad, during the period from April 13, last, to June 30, train No. 70 was operated 3,740 miles, carried 228 passengers and earned a total gross revenue of $1,372, or an average revenue per train-mile of 36.7 cents. During the same period, train No. 71 was operated 3,740 miles, carried 279 passengers and earned a total gross revenue of $1,517, or an average revenue per train-mile of 40.6 cents. The cost of operating these trains was 62 cents a mile. Similar figures with respect to the other two trains were also presented by the road.

Continued on Next Left Hand Page

OPERATING ECONOMY

Big Savings in the Back Shop

EVERY dollar saved is a dollar earned and it makes no difference what department accomplishes the savings.

The cost of production in your back shops depends upon the quality of the material being machined.

Castings made of HUNT-SPILLER *Air Furnace* GUN IRON are manufactured very close to finished sizes and require less removal of stock—less time to machine. Their uniformity permits maximum cutting speeds.

Saves In The Shops As Well As On The Road.

HUNT-SPILLER MFG. CORPORATION

J. G. Platt, Pres. & Gen. Mgr. V. W. Ellet, Vice-President.

Office & Works

383 Dorchester Ave. South Boston, 27, Mass.

Canadian Representative: Joseph Robb & Co., Ltd., 997 Aqueduct St., Montreal, P. Q.
Export Agent for Latin America:
International Rwy. Supply Co., 30 Church Street, New York, N. Y.

H S G I

Reg. U. S. Trade Mark

Cylinder Bushings
Cylinder Packing Rings
Pistons or Piston Bull Rings
Valve Bushings
Valve Packing Rings
Valve Bull Rings
Crosshead Shoes
Hub Liners
Shoes and Wedges
Floating Rod Bushings

Parts Finished for Application

Dunbar Sectional Type Packing
Duplex Sectional Type Packing
(Duplex Springs for Above Sectional Packing)
Cylinder Snap Rings
Valve Rings All Shapes

HUNT-SPILLER GUN IRON

Air Furnace

Railway Officers

OPERATING

Following the absorption of the Western division of the Union Pacific by the Wyoming and Nebraska divisions, there have been a number of changes in personnel. **W. C. Wolcott,** superintendent of the Wyoming division, has moved his headquarters from Cheyenne, Wyo., to Green River. **H. A. Connett,** superintendent of the Western division, with headquarters at Green River, has been appointed assistant superintendent of the Wyoming division, with headquarters at Cheyenne, succeeding **T. E. Williams,** who has been appointed trainmaster, with headquarters at Green River. **F. C. Paulson,** assistant superintendent on the Nebraska division, has had his headquarters transferred from Omaha to North Platte, Neb.

F. W. Stoops, who has been appointed superintendent of the Toledo division of the Pennsylvania, as noted in the *Railway Age* for October 24, has been with the Pennsylvania for more than 31 years. He was born on June 13, 1883, at Lowellville, Ohio, and after a high school education, entered the service of the Pennsylvania on June 15, 1900, as a car inspector on the Eastern division. From September 15, 1900, to January 9, 1901, he was out of railway service but re-entered the employ of the Pennsylvania on the latter date as a locomotive fireman on the Eastern division, being promoted to engineman on the same division on September 11,

F. W. Stoops

1905. About 10 years later, Mr. Stoops was appointed acting assistant road foreman of engines on this division, being appointed assistant road foreman of engines on February 1, 1917. On September 1 of the same year he was further promoted to assistant trainmaster and on March 1, 1920, he was advanced to road foreman of engines on the Pittsburgh Terminal division. A year later Mr. Stoops returned to the Eastern division as assistant road foreman of engines, and on November 1, 1925, he was appointed acting freight trainmaster of the Panhandle division, being promoted to freight trainmaster of this division on June 16, 1926. A year later he was transferred to the Middle division, where he remained until his recent promotion to superintendent of the Toledo division, with headquarters at Toledo, Ohio, which was effective on October 16.

TRAFFIC

J. G. Woodworth, vice-president in charge of traffic of the Northern Pacific, with headquarters at St. Paul, Minn., at his own request has been relieved of his traffic duties, effective November 1, and will continue as vice-president with such duties as may be assigned to him. **R. W. Clark,** general traffic manager, at St. Paul, has been placed in charge of the traffic department.

In preparation for the opening, on November 10, of the new Western Pacific-Great Northern connection in California, the Western Pacific has opened a number of traffic offices in Oregon and Washington. **Arthur H. Lund,** city freight agent at San Francisco, Cal., has been promoted to general agent in charge of a new office at Spokane, Wash. **Frank B. Stratton,** perishable traffic agent at San Francisco, has been appointed general agent, with headquarters at Seattle, Wash. **E. A. McCarthy,** passenger and freight traffic agent at Chicago, has been promoted to general agent, with headquarters at Portland, Ore. **W. C. Wilkes,** commercial agent, with headquarters at Oakland, Cal., has been sent to Klamath Falls, Ore., as general agent.

There have also been a number of changes among traffic officers of the Great Northern in preparation for the opening of the new connecting line. **B S. Merritt,** assistant general freight agent of Seattle, has been promoted to general freight agent, at San Francisco, a newly-created position. **Edward A. Dye,** general agent, with headquarters at Vancouver, B. C., has been promoted to assistant general freight agent at Seattle, to succeed Mr. Merritt. **Alfred H. Hebb,** general agent, with headquarters at Victoria, B. C., has been transferred to Vancouver, to succeed Mr. Dye. New traffic agencies have been established at Sacramento, Cal., and Oakland. **George R. Lally,** traveling freight agent at Seattle, has been promoted to general agent at Sacramento, and **George A. Sorrell,** traveling agent at San Francisco, has been promoted to general agent at Oakland.

MECHANICAL

Effective November 1, **J. P. Chadwick,** mechanical engineer of the Southern, with headquarters at Washington, D. C., will be promoted to assistant to vice-president, mechanical, vice **R. L. Ettenger,** transferred at his own request, to the position of mechanical engineer.

ENGINEERING AND SIGNALING

F. A. Jones, division engineer of the Little Rock division of the Missouri Pacific, has had his jurisdiction extended to include the Louisiana division, with headquarters at Monroe, La., succeeding **G. S. Smith.**

W. R. Bennett, chief engineer maintenance of way of the Wabash, with headquarters at St. Louis, Mo., has been appointed division engineer on the Ann Arbor (a subsidiary of the Wabash), with headquarters at Owosso, Mich., succeeding **R. D. Copeland,** who has been appointed assistant engineer at the same point. The position of chief engineer maintenance of way of the Wabash has been abolished and the duties assumed by **E. L. Crugar,** chief engineer.

J. M. Harper, division engineer of the New Orleans division of the Illinois Central, has moved his headquarters from Baton Rouge, La., to Vicksburg, Miss., where he has jurisdiction over the same territory, following the consolidation of the New Orleans and Vicksburg Route divisions into one division, to be known as the Vicksburg division. **C. J. Carney,** division engineer of the former Vicksburg Route division, with headquarters at Vicksburg, Miss., retains his position on the new division with the same headquarters.

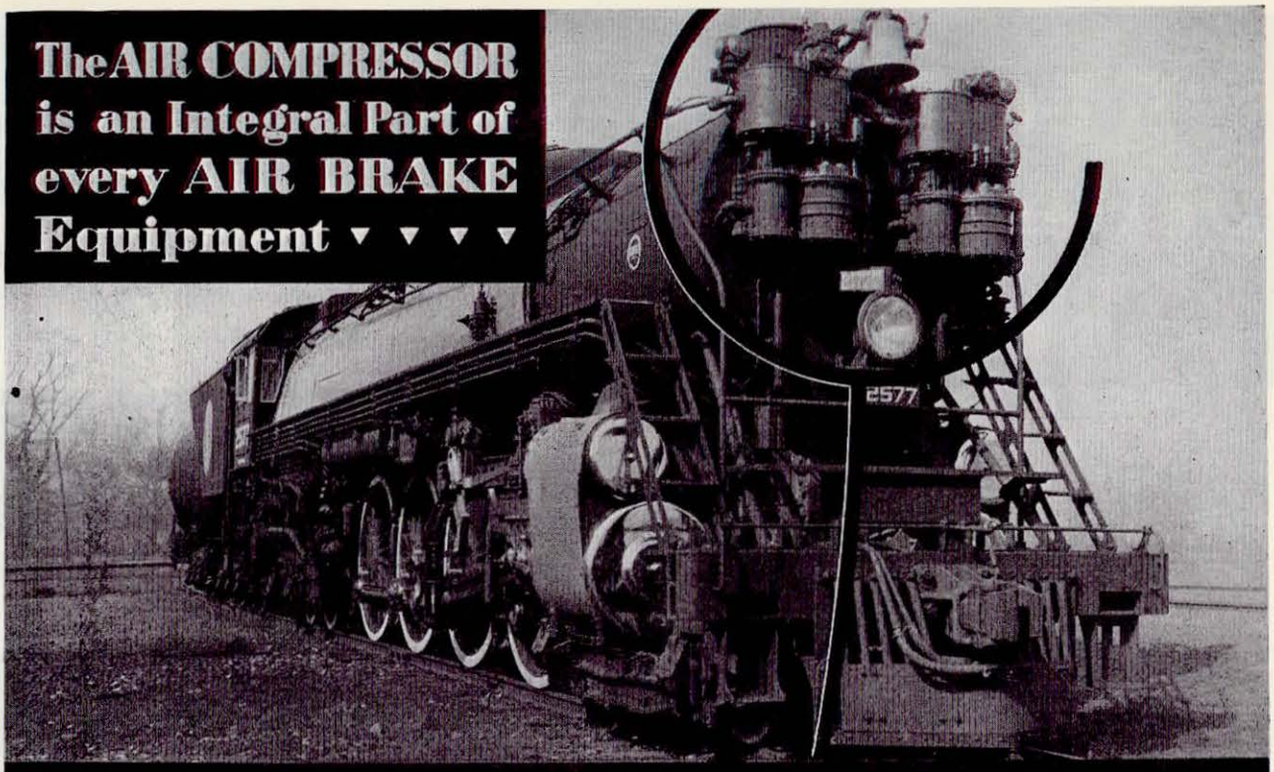
OBITUARY

J. W. Branch, auditor of station accounts of the Chicago & North Western, with headquarters at Chicago, died on October 22, at his home in Evanston, Ill.

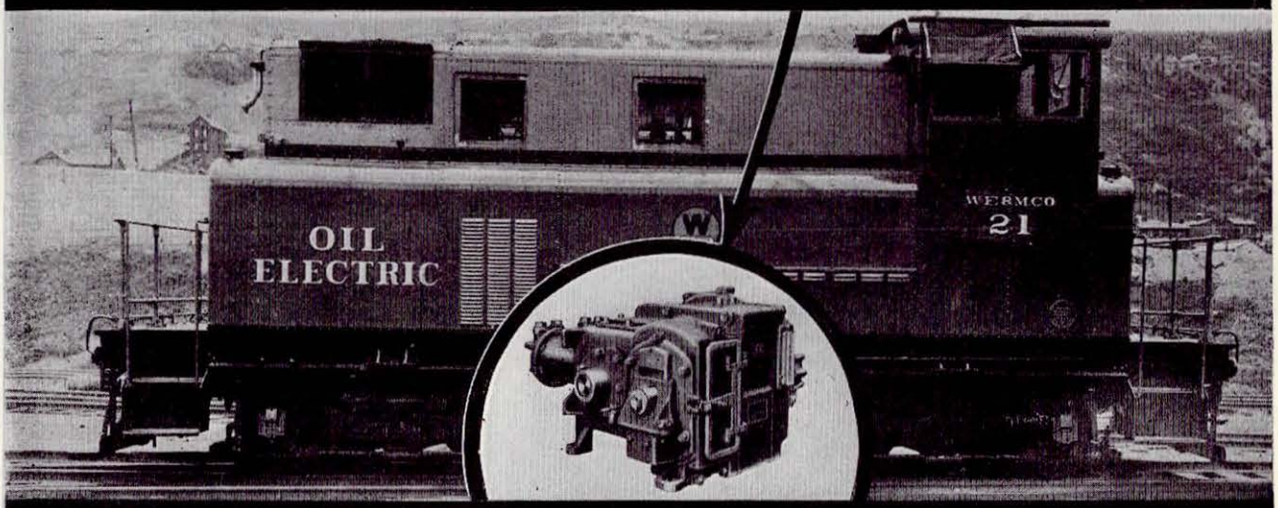
Cushman Quarrier, who retired in 1901 as controller of the Louisville & Nashville, died on October 19, at Wheeling, W. Va., at the age of 92 years.

Charles S. Wight, general freight representative of the Baltimore & Ohio, died at his home in Baltimore, Md., on October 23. Mr. Wight was born at Galena, Ill., on August 9, 1849. He began his railroad career as messenger with the Little Miami Railroad (now part of the Pennsylvania), on October 2, 1866, and served successively as clerk and agent until 1877. On September 22, 1877, he commenced service with the B. & O., as westbound agent of its fast freight service—the Continental Line. From 1896 to 1909, he was manager of freight traffic at Baltimore, and general traffic manager from 1909 to September, 1911. On the latter date he became general freight traffic manager, which position he held until 1916, when he was appointed general freight representative.

The AIR COMPRESSOR is an Integral Part of every AIR BRAKE Equipment ▼ ▼ ▼ ▼



FOR STEAM LOCOMOTIVES



FOR ELECTRIC LOCOMOTIVES

FOR RAIL MOTOR CARS

WESTINGHOUSE AIR BRAKE CO.

GENERAL OFFICE AND WORKS

WILMERDING, PA.

STOKER Dependability Records

A survey of Standard Stoker performance on a large number of roads shows an average of —

25,000 Locomotive Miles

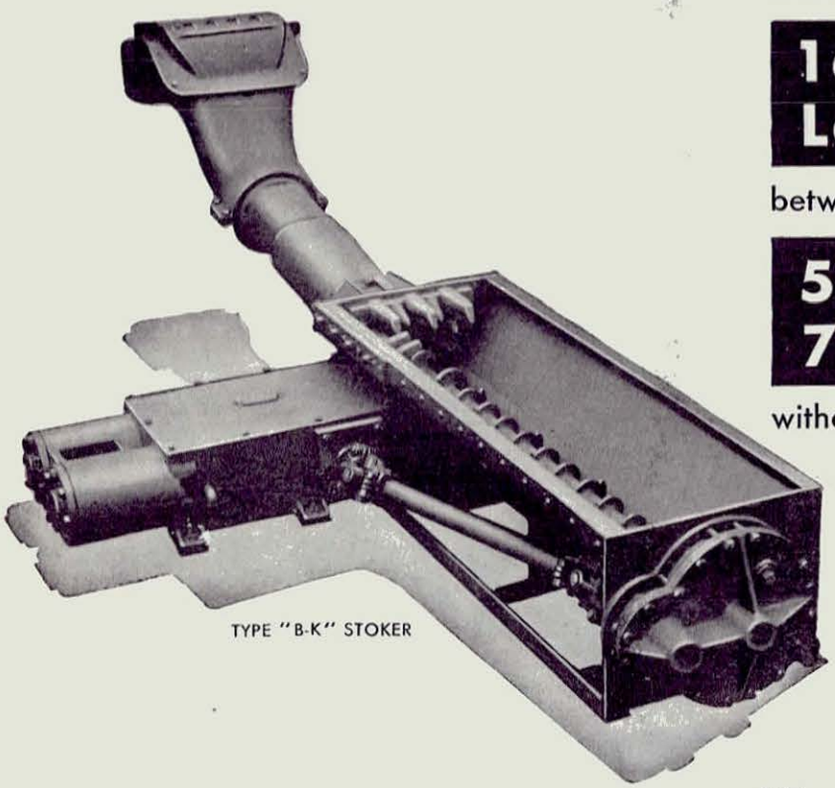
before any running repairs on the stoker are needed —

165,000 Locomotive Miles

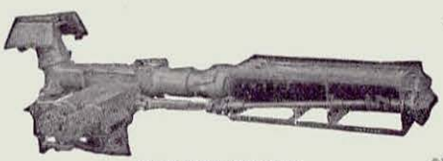
between overhaulings —

500,000 to 720,000 Miles

without stoker failure.



TYPE "B-K" STOKER

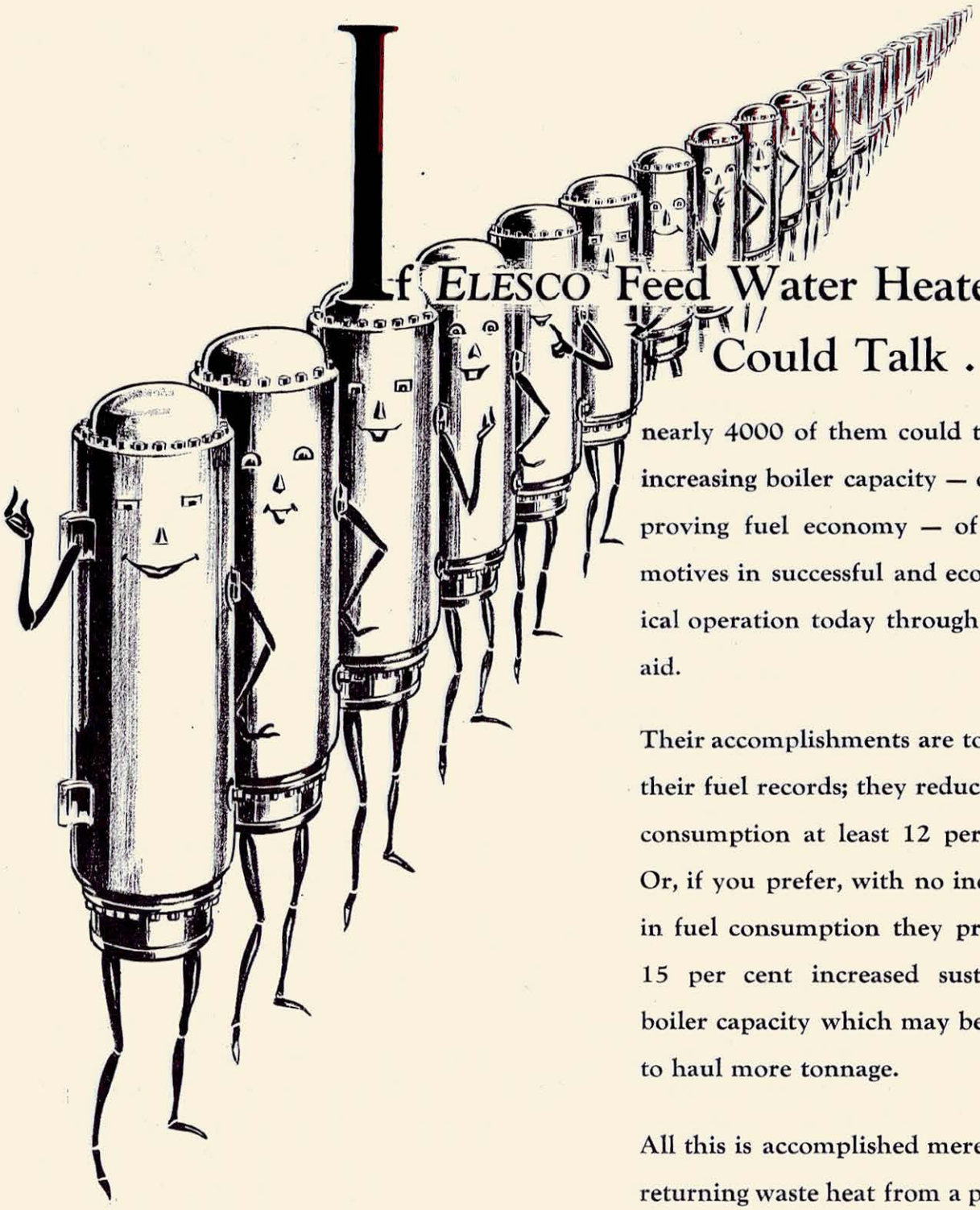


TYPE "B" STOKER

WITH the stoker operating continuously over long runs, firing various grades of coal, having "tramp iron" and other foreign matter in the fuel to contend with, such performance reflects stoker firing dependability under all conditions of operation.

THE STANDARD STOKER COMPANY, Inc.

NEW YORK CHICAGO ERIE



If ELESCO Feed Water Heaters Could Talk . . .

nearly 4000 of them could tell of increasing boiler capacity — of improving fuel economy — of locomotives in successful and economical operation today through their aid.

Their accomplishments are told by their fuel records; they reduce fuel consumption at least 12 per cent. Or, if you prefer, with no increase in fuel consumption they provide 15 per cent increased sustained boiler capacity which may be used to haul more tonnage.

All this is accomplished merely by returning waste heat from a part of the exhaust steam through the Elesco feed water heater, thence to the boiler for useful work — heat that otherwise would be wasted. What better means of economy could you institute now than to apply Elesco feed water heaters?

THE SUPERHEATER COMPANY

60 East 42nd Street
NEW YORK

ELESCO

Peoples Gas Building
CHICAGO

Canada: The Superheater Company, Limited, Montreal

Superheaters
Superheated Steam Pyrometers
Feed Water Heaters
Exhaust Steam Injectors

A-645

5 ELECTRIC FURNACES *in one railroad shop* SAVE $24,000 ANNUALLY

THE POSSIBLE APPLICATIONS of electric heat in the average railroad shop are numerous. Many shops are taking advantage of the economies of some of these applications; a few have extensive electrical equipment; some have none.

THE MANY ADVANTAGES of electric heat are in general appreciated—such results as, uniformity of heating, ease of control, continuity of operation, quality of product, speed of production, low maintenance of equipment, removal of uncertainty in the manufacturing process. But the actual saving resulting from the use of electric heat is rarely fully appreciated.

IN ONE RAILROAD SHOP, where 15 furnaces, ovens and melting pots ranging from 8 kw. to 540 kw. capacity, were installed, careful records have been maintained to definitely establish the resulting savings.

IN THE TOOL HEAT-TREATING department, for instance, three electric furnaces —8 kw. for pre-heating high-speed steel, 13 kw. for hardening carbon steel, 30 kw. for hardening high-speed steel—save annually nearly $7000. Records show that, due to the use of the electric furnaces, high-speed steel tool cost has decreased 25% and the life of tools has increased one-third. As a result there has been a labor and material saving of $291.20 and $280.00 per month, respectively.

TWO 120 KW. CARBURIZING FURNACES in the forge department have effected an annual net saving of more than $17,000.00. This saving is 13 times the cost of the electric power. Because of the much greater exactness of heat treatment it is estimated that the useful life of many of the major pieces of the carburized parts has been more than doubled.

THE FOREGOING are a few examples from one shop. More complete information on these and other applications in this shop is included in Reprint 450. Our nearby district office will be glad to send you a copy of this publication or to make an engineering study for you of the possible economies to be obtained from the use of electric heating applications in your shop.

Electric heat gives you the RIGHT temperature at EVERY point in the chamber

Westinghouse

WESTINGHOUSE ELECTRIC

T 31912

SPEED UP

A foaming engine delays train movement. Prevent foaming and speed up traffic by using "B-A Anti-Foam."

"B-A Anti-Foam" increases the tonnage hauled, reduces terminal delays, improves lubrication and cuts fuel and water consumption. Moreover it gives the engine man the advantage of a better engine to work with.

Consult Bird-Archer. Their water treatment experts are worth while calling upon.

THE BIRD-ARCHER COMPANY

New York Chicago
Philadelphia

The BIRD-ARCHER COMPANY, *Ltd.*, Montreal
Laboratories and Plants at Philadelphia, Chicago and Cobourg, Ont.

A.R.A. Standard "D" Couplers

Pitt Couplers
Penn Couplers
for Cars and Locomotives

Pitt Pivoted and "D" Couplers

designed especially for
Passenger Train Cars

The McConway & Torley Company

48th St. & A. V. Ry., Arsenal Station
Pittsburgh, Pa.

MAGNUS COMPANY

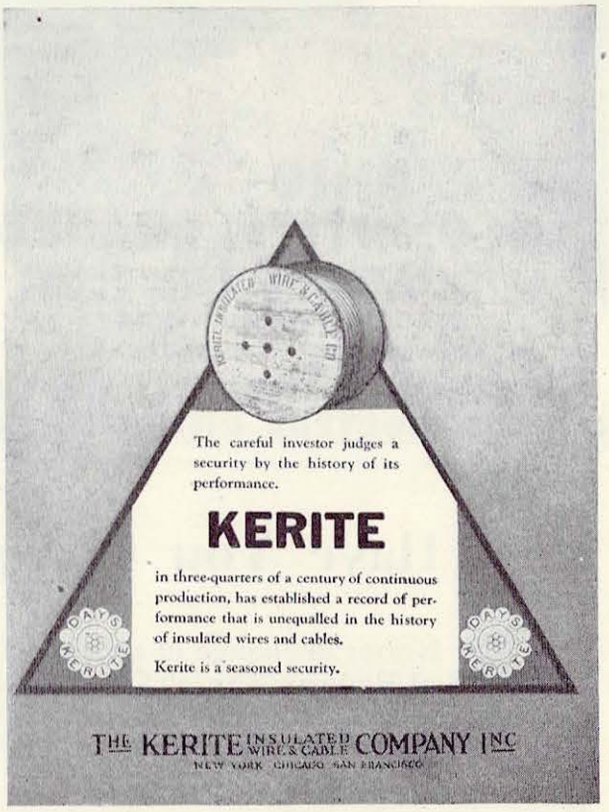
(INCORPORATED)

Journal Bearings

AND

Bronze Engine Castings

New York Chicago


The careful investor judges a security by the history of its performance.
KERITE
in three-quarters of a century of continuous production, has established a record of performance that is unequalled in the history of insulated wires and cables.
Kerite is a seasoned security.
THE KERITE INSULATED WIRE & CABLE COMPANY INC
NEW YORK CHICAGO SAN FRANCISCO

CAMEL YOUNGSTOWN

Freight Car Door Fixtures

Corrugated Steel Freight Car Doors

CAMEL SALES COMPANY 332 South Michigan Avenue CHICAGO, ILLINOIS

MT. VERNON CAR MFG. CO. MT. VERNON, ILL.

70-Ton All Steel Hopper Car

Builders of All Kinds of Freight Cars

Annual Capacity { 12,000 Freight Cars; 125,000 { Chilled Tread Wheels; 20,000 Tons Forgings

Individual Shop and Special Facilities for Rebuilding and Repairing Cars

OHIO LOCOMOTIVE CRANES

ERECTION CRANES - LOGGING CRANES
WHARF, BARGE AND GANTRY CRANES
RAILROAD PILE DRIVERS
CRAWLER CRANES & SHOVELS

THE OHIO LOCOMOTIVE CRANE CO.
BUCYRUS, OHIO

BARBER LATERAL-MOTION DEVICE

1,300,000 cars in service on over 60 Railroads and Car Lines

ROLLER SIDE-BEARINGS

Reduces Friction on Rails 15%
Lessens Wheel Flange Wear

STANDARD CAR TRUCK CO.
McCORMICK BUILDING CHICAGO

Have You Changed Your Address?

Notice of change of address of subscribers should reach the office of Railway Age, 30 Church St., New York, ten days in advance to insure delivery of the following issue to new address. In sending notification of change always include the old address as well as the new.

Name ..... Old Address .....
New Address .....
..... Position ..... Company .....

New Journal Box Lid requirements per A.R.A. circular No. A-337-1930 are complied with in ASCO A. R. A. Special Torsion Spring Journal Box Lids.

Allegheny

Allegheny Steel Company, General Offices and Works: Brackenridge, Pa. New York, Milwaukee, Buffalo, Cleveland, St. Louis, Chicago, Los Angeles, Dunbar

Sheets for Automobile Bodies · Metallic Furniture · Deep Draws · Allegheny Metal · Accoloy · Electrical Sheets · Steel Castings · Boiler Tubes · Pipe

WINE RAILWAY APPLIANCE CO.
TOLEDO, OHIO

Details of our products appear in following issues of Railway Age during 1931

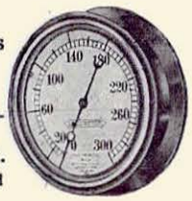
January 3—February 7—March 7—April 4—May 2—June 6—July 4—August 1—or Railway Mechanical Engineer.

EDGEWATER STEEL COMPANY
PITTSBURGH, PA.

Details of our products appear in the following issues of Railway Age during 1931:

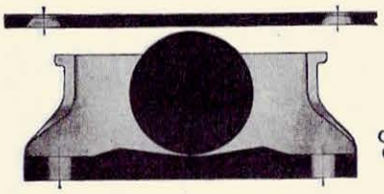
May 16—June 13—July 4—Aug. 1, 8, 15, 22, 29—Sept. 5, 12.

Ashton High Grade
Pop Valves—Steam Gauges
the quality standard for over 50 years.
Exclusive features insuring greatest efficiency and durability.
THE ASHTON VALVE CO.
New York, Boston, Chicago and San Francisco



UNION STEEL CASTING COMPANY PITTSBURGH, PA.

Cast Steel Locomotive Cylinders, Carbon and Vanadium Cast Steel Locomotive Frames, Wheel Centers, Crossheads and General Miscellaneous Castings for Locomotive and Car Work.



STUCKI SIDE BEARINGS
Manufactured by
A. Stucki Co.
Oliver Bldg., Pittsburgh, Pa.
Canadian Representative:
The Holden Co., Ltd.,
Montreal, Can.

Western DUMP CARS
Are Quick Operating
WESTERN WHEELED SCRAPER CO.
Builders of Air Dump Cars
AURORA, ILLINOIS

UNARCO
Asbestos and Rubber Packings for Railroad Use. Asbestos Insulating Materials
UNION ASBESTOS & RUBBER CO.
310 South Michigan Ave. Chicago, Ill.

BUFFALO BRAKE BEAM CO.
—BRAKE BEAMS—
AUXILIARY SUPPORTS FOR BRAKE BEAMS
NEW YORK AND BUFFALO

Hollow Iron Bars up to 14 ft. long—Solid to 18 ft. Hollow or solid Stays, plain, headed, or headed and threaded.

Nichols Transfer Tables
Turntable Tractors
Geo. P. Nichols & Bro. Chicago
2139 Fulton Street

TIE PLATES
Track Appliances
Highway Crossing Signals
Signal Accessories
THE RAILROAD SUPPLY COMPANY
CHICAGO NEW YORK

A QUALITY PRODUCT
RESULT OF 40 YEARS EXPERIENCE
TUCOLITH
FLEXOLITH
CAR FLOORING
TUCO PRODUCTS CORP.
30 CHURCH STREET, NEW YORK
122 S. MICHIGAN AVE., CHICAGO

THE "FAIR"
RAIL ANTI-CREEPER
THE P. & M. Co.
CHICAGO NEW YORK
Montreal London Paris Calcutta Sydney

Our tests determine the best type of shoe for each type of service
The American Brake Shoe & Foundry Co.
230 Park Ave., New York 332 So. Michigan Ave., Chicago

Union Spring & Manufacturing Co.
Steel Castings, Coil Springs, Spring Plates, Elliptic Springs, Journal Box Lids
Kensington (All Steel) Journal Box
WORKS
New Kensington, Pa.
PITTSBURGH OFFICE
2001 Clark Building

PROFESSIONAL DIRECTORY

BATTEY & KIPP
INCORPORATED
Engineers
Complete Railroad Shops and Locomotive Terminals
Power Plants
Industrial Properties
231 So. La Salle St., Chicago

Robert W. Hunt Company
ENGINEERS
Inspection—Tests—Consultation
All Railway Equipment, Structures and Materials
General Office:
22nd Floor Insurance Exchange
CHICAGO
Offices in all principal cities

JOHN E. MUHLFELD
TRANSPORTATION ENGINEERING
25 Broad Street, New York

Place Your Card Here

Gulick-Henderson Company
ENGINEERS
Inspection and Tests
Materials and Equipment for Railways
General Office
19 West 44th Street, New York
Branches Main Mill Districts U. S.
Dusseldorf, Germany

Use This Space for Your Card

Pittsburgh Testing Laboratory
Pittsburgh, Penna.
Analysis . . Inspection . . Testing . . Research
Branch Offices in the Principal Cities

Second Hand Equipment — Get Together Department — Factory and Railroad Equipment

POSITION OPEN

IF you are open to overtures for new connection, and qualified for a salary between $2,500 and $25,000, your response to this announcement is invited. The undersigned provides a thoroughly organized service of recognized standing and reputation, through which preliminaries are negotiated confidentially for positions of the calibre indicated. The procedure is individualized to each client's personal requirements; your identity covered and present position protected. Established twenty-one years. Send only name and address for details. R. W. Bixby, Inc., 102 Downtown Building, Buffalo, New York.

LUBRICATING ENGINEER who has had service in Spanish speaking countries. Must be familiar with the language, have had experience as a locomotive engineer and have executive ability. Submit recent photograph with your application to Box 849, Railway Age, 30 Church St., New York City.

POSITION WANTED

OPPORTUNITY DESIRED with Railway Supply Company or Machine Tool Builder. Technical graduate with 12 years of practical railroading in mechanical department of large system, plus broad experience in railway supply marketing methods, desires position as sales engineer or as assistant to busy executive. Capable of conducting tests or handling all details including preparation of catalogs and all other publicity. Address Box 839, Railway Age, 30 Church Street, New York City.

EDUCATIONAL

SEND for Free Special Bulletin and learn how to increase your knowledge of practical railroad work and fit yourself for promotion. The Railway Educational Bureau, Omaha, Neb.

IRON & STEEL PRODUCTS, Inc.
Frank Parker, Pres.
Specializing in
FREIGHT & TANK CARS
RAILWAY EQUIPMENT
CAR PARTS
IRON & STEEL
80 East Jackson Chicago
Send us your inquiries

Place your Classified Advertisement here.

Your Classified Advertisement should appear here.

RAILS
New and Relaying — Frogs — Tie Plates — Angle Bars—Cars of all types including Tank Cars, Hart Cars, Flat Cars, Box Cars—Railway Equipment—Used Car Parts—Steel Sheet Piling, both new and used.
HYMAN-MICHAELS COMPANY
New York, Los Angeles, Seattle, St. Louis
20 No. Wacker Drive Bldg. CHICAGO Paris, France
Pittsburgh, Houston, Portland, San Francisco

Your classified advertisement should appear in this section.

For location of advertisements in this issue of manufacturers listed in the Buyers Index, see Advertisers Index on the last page next to cover

BUYERS INDEX

Accounting Machines.
Remington Rand Business Service.

Acetylene, Dissolved.
Oxweld Railroad Service Co., The.

Aftercoolers, Air.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.

Air Brakes.
New York Air Brake Co.
Westinghouse Air Brake Co.

Aircraft Corrugated Sheet.
Aluminum Co. of America.

Aircraft Extruded & Rolled Shapes.
Aluminum Co. of America.

Aircraft Plates.
Aluminum Co. of America.

Aircraft Screw Machine Products.
Aluminum Co. of America.

Aircraft Streamline & Round Tubing.
Aluminum Co. of America.

Air Lifts.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.

Airport Drainage.
Republic Steel Corp.

Air Pumps.
New York Air Brake Co.
Union Asbestos & Rubber Co.
Westinghouse Air Brake Co.
Worthington Pump & Machinery Corp.

Air Reservoir Joints—(See Joints, Air Reservoir).

Alloy Steel.
Bethlehem Steel Co.
Illinois Steel Co.
Republic Steel Corp.
Ryerson & Son, Inc., Jos. T.

Alloys, Strong Aluminum.
Aluminum Co. of America.

Angle Bars — (See Joints, Rail).

Angles, Channels and Tees—(See Shapes, Structural).

Anti-Creepers, Rail.
Bethlehem Steel Co.
P. & M. Company, The.

Arch, Locomotive Brick.
American Arch Co., Inc.

Arresters, Lightning.
General Electric Co.
General Railway Signal Co.
P. & M. Company.
Railroad Supply Co., The.
Union Switch & Signal Co.
Westinghouse Elec. & Mfg. Co.

Ash Conveyors.
Industrial Brownhoist Corp.

Ash Handling Machinery.
Industrial Brownhoist Corp.
Milwaukee Electric Crane & Hoist Corp.

Ash Pans, Cast Steel.
General Steel Castings Corp.

Auxiliary Locomotive.
Bethlehem Steel Co.

Axles, Car and Locomotive.
American Locomotive Co.
Baldwin Locomotive Works.
Bethlehem Steel Co.
Carnegie Steel Co.
Illinois Steel Co.
Lima Locomotive Works.
Midvale Co., The.
Standard Steel Works Co.

Axles, Mine Car.
Brill Co., The J. G.
Mt. Vernon Car Mfg. Co.

Axles, Motor Trucks.
Timken-Detroit Axle Co.

Babbitt Metal.
National Bearing Metals Corp.
Ryerson & Son, Inc., Jos. T.
Westinghouse Elec. & Mfg. Co.

Baggage Door Controller Device.
Edwards Co., O. M.

Barges, Steel.
American Bridge Co.

Barges, Treated.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
National Lumber & Creosoting Co.

Bars, Concrete, Reinforcing.
Carnegie Steel Co.
Central Alloy Steel Corp.
Illinois Steel Co.
Inland Steel Co.
Ryerson & Son, Joseph T.

Bars, Iron and Steel.
Armco Railroad Sales Co.
Carnegie Steel Co.
Ewald Iron Co.
Falls Hollow Staybolt Co.
Illinois Steel Co.
Inland Steel Company.
Lockhart Iron & Steel Co.
McConway & Torley Co.
Republic Steel Corp.
Ryerson & Son, Joseph T.

Bars, Rolled Steel.
Carnegie Steel Co.

Batteries, Lighting.
Electric Storage Battery Co.

Batteries, Starting.
Electric Storage Battery Co.

Batteries, Storage.
Electric Storage Battery Co.
Railroad Supply Co.
Safety Car Heating & Lighting Co.

Batteries, Wet Cell.
Electric Storage Battery Co.

Beams, Channel & Angle.
Carnegie Steel Co.
Illinois Steel Co.
Ryerson & Son, Inc., Joseph T.

Bearings, Axle Generator.
S. K. F. Industries, Inc.
Westinghouse Elec. & Mfg. Co.

Bearings, Ball Thrust.
S. K. F. Industries, Inc.
Timken Roller Bearing Co., The.

Bearings, Center.
Brill Co., The J. G.
Chicago Railway Equipment Co.
Miner, W. H.
Pressed Steel Car Co.
Symington Co., The.

Bearings, Journal.
Fafnir Bearing Co.
Magnus Co., Inc.
National Bearing Metals Corp.
S. K. F. Industries, Inc.
Timken Roller Bearing Co., The.

Bearings, Journal Roller.
Fafnir Bearing Co.
S. K. F. Industries, Inc.
Timken Roller Bearing Co., The.

Bearings, Roller.
American Steel Foundries Co.
Fafnir Bearing Co.
Hyatt Roller Bearing Co.
Miner, W. H.
Shafer Bearing Corp.
S. K. F. Industries, Inc.
Standard Car Truck Co.
Stucki Co., A.
Timken Roller Bearing Co.
Wine Railway Appliance Co.

Bearings, Roller Side.
Q. & C. Company, The.
Standard Coupler Co.
Stucki Co., A.

Bearings, Side.
American Steel Foundries.
Chicago Railway Equipment Co.
Fort Pitt Malleable Iron Co.
Standard Car Truck Co.
Stucki Co., A.
Wine Railway Appliance Co.

Beds, Cast Steel, Locomotive.
General Steel Castings Corp.

Bell Ringer, Locomotive.
Ardco Mfg. Co.
Prime Mfg. Co., The.

Bells, Highway Crossing.
Railroad Supply Co.

Belt Lacing Machines.
Birdsboro Steel Foundry & Mach. Co.

Benders, Rail.
Q & C Co., The

Bending and Straightening Machines.
Ryerson & Son, Jos. T.
Sellers & Co. Inc., Wm.

Billets, Steel.
Carnegie Steel Co.
Illinois Steel Co.
Inland Steel Co.
McConway & Torley Co.
Midvale Co., The.
Ryerson & Son, Jos. T.
Republic Steel Corp.
Standard Steel Works Co.

Blocks, Chain.
Barco Mfg. Co.

Blocks, Creosoted.
American Creosoting Co.
Central Coal & Coke Co.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
International Creosoting & Constr. Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.

Blooms, Steel.
Carnegie Steel Co.
Republic Steel Corp.

Blower Fittings, Automatic Smokebox.
Barco Mfg. Co.

Blowers, Turbo.
Ingersoll-Rand Co.

Blowtorches, Acetylene.
Oxweld Railroad Service Co., The.

Boiler (all types).
Baldwin Locomotive Works, The.

Boiler Checks.
Prime Manufacturing Co., The.

Boilers, Locomotive.
American Locomotive Co.
Baldwin Locomotive Works
Lima Locomotive Works.

Boilers, Scale Proof.
Industrial Brownhoist Corp.

Bolsters, Steel.
American Steel Foundries.
Bettendorf Co., The.
Birdsboro Steel Foundry & Mach. Co.
Bradford Corporation.
Brill Co., The J. G.
Buckeye Steel Castings Co.
Gould Coupler Co., The.
Mt. Vernon Car Mfg. Co.
Ohio Steel Foundry Co., The
Pressed Steel Car Co.
Symington & Son, Inc., T. H.

Bolts and Nuts.
Baldwin Locomotive Works, The
Bethlehem Steel Co.
Buffalo Brake Beam Co.
Dardelet Threadlock Corp.
Neely Nut & Bolt Co.
Russell, Burdsall & Ward Bolt and Nut Co.
Ryerson & Son, Joseph T.
Westinghouse Elec. & Mfg. Co.

Bolts & Nuts, Monel Metal.
International Nickel Co., The.

Bolts, Patch.
Falls Hollow Staybolt Co.
Ryerson & Son, Joseph T.

Bolts, Track.
Illinois Steel Co.
Inland Steel Co.
Ryerson & Son, Joseph T.

Bonders, Rail.
Q & C Co., The.

Bonding Rail Outfits.
Ingersoll-Rand Co.

Bonds, Rail.
American Steel & Wire Co.
Railroad Supply Co.
Westinghouse Elec. & Mfg. Co.

Bonds, Signal.
American Steel & Wire Co.
Railroad Supply Co.

Bond, Wire Protection.
P & M Co., The.

Boosters, Locomotives.
Franklin Railway Supply Co., Inc.

Boring & Drilling Machines, Horizontal.
Ryerson & Son, Joseph T.
Sellers & Co., Inc., Wm.

Boring Machines, Car Wheel
Sellers & Co., Inc., Wm

Boring & Turning Mills, Horizontal.
Sellers & Co., Inc., Wm.

Boring & Turning Mills, Vertical.
Sellers & Co., Inc., Wm.

Bottom Rod Supports.
Buffalo Brake Beam Co.

Braces, Rail
Bettendorf Co., The.
Fort Pitt Malleable Iron Co.
National Malleable & Steel Castings Co.
Q & C Co., The.
Ramapo Ajax Co.
Symington Co., The.

Brake Beam Safety Guards.
Buffalo Brake Beam Co.
Chicago Railway Equipment Co.

Brake Beam Supports.
American Steel Foundries.
Brill Co., The J. G.
Buffalo Brake Beam Co.
Chicago Railway Equipment Co.

Brake Beams.
American Steel Foundries.
Bradford Corporation.
Buffalo Brake Beam Co.
Chicago Railway Equipment Co.
Hunt-Spiller Mfg. Corp.
Mt. Vernon Car Mfg. Co.
National Malleable & Steel Castings Co.
Pressed Steel Car. Co.

Brake Drums.
American Car & Foundry Motors Co.
Hunt-Spiller Mfg. Corp.

Brake Forgings, Pins, Levers, etc.
American Steel Foundries.
Brill Co., The J. G.
Buffalo Brake Beam Co.
Davis Brake Beam Co.
Mt. Vernon Car Mfg. Co.
Schaefer Equipment Co.

Brakes, Hand.
National Brake Co.

Brake Heads.
American Steel Foundries.
Brill Co., The J. G.
Buffalo Brake Beam Co.
Chicago Railway Equipment Co.
Pressed Steel Car Co.

Brake Jaws.
Mt. Vernon Car Mfg. Co.
National Malleable & Steel Castings Co.
Schaefer Equipment Co.

Brake Shoes.
American Brake Shoe & Foundry Co.
American Steel Foundries.
Brill Co., The J. G.
Buckeye Steel Castings Co.
Fort Pitt Malleable Iron Co.

Brakes, Air.
General Electric Co.
New York Air Brake Co.
Westinghouse Air Brake Co.

Brakes, Clasp.
American Steel Foundries.

Brakes, Electric.
New York Air Brake Co.
Westinghouse Air Brake Co.

Brakes, Hand.
Miner, W. H.
National Brake Co.
National Malleable & Steel Castings Co.
Wine Railway Appliance Co.

Brass, Sash.
Edwards Co., O. M.

Brick, Locomotive Arch.
American Arch Co., Inc.

Bridge Builders.
American Bridge Co.
Bethlehem Steel Co.

Bridge & Crossing Planks, Treated.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
Curtin-Howe Corp.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.

Bridge Flooring.
Carey Co., The, Philip.

Bridge Material, Treated.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
Curtin-Howe Corp.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.

Bridge Stringers — (See Stringers, Bridge).

Bronze Powder, Aluminum.
Aluminum Co. of America.

Bucket Handling.
Industrial Brownhoist Corp.
Milwaukee Electric Crane & Hoist Corp.

Buckets, Grab.
American Bridge Co.
American Hoist & Derrick Co.
Industrial Brownhoist Corp.
Milwaukee Electric Crane & Hoist Corp.
Orton Crane & Shovel Co.

Buffers, Friction.
Edgewater Steel Co.
Miner, W. H.
Standard Coupler Co.
Westinghouse Air Brake Co.

Buffers, Radial.
Franklin Railway Supply Co., Inc.

Building Materials.
Carey & Co., Philip, The.
Johns-Manville Corp.

Buildings, Iron, Steel and Steel Concrete.
American Bridge Co.
United Engineers & Constructors, Inc.

Bulldozers.
Ryerson & Son, Joseph T.

Buses, Motor.
Reo Motor Car Co.

Bushings, Driving and Engine Truck Boxes.
Locomotive Finished Material Co.

Cable Accessories, Electrical.
Graybar Electric Co.

Cables, Electric.
American Steel & Wire Co.
Anaconda Wire & Cable Co.
General Electric Co.
Graybar Electric Co.
Kerite Insulated Wire & Cable Co.

Cableways—(See Tramways).

Caps, Grease.
Prime Mfg. Co., The.

Carbide, Calcium.
Oxweld Railroad Service Co.

Car Insulation.
Carey & Co., Philip, The.
Wood Conversion Co.

Car Lighting Equipment—(See Lighting, Car Equipment).

Carlines.
Hutchins Car Rfg. Co.
Mt. Vernon Car Mfg. Co.
Pressed Steel Car Co.

Car Material, Wood.
Central Coal & Coke Co.

Car Parts and Appliances.
Pressed Steel Car Co.
Pullman Car & Mfg. Corp.

Car Parts, Freight.
Bettendorf Co., The.
General American Tank Car Corporation.
Pressed Steel Car Co.

Car Parts, Passenger.
Brill Co., The J. G.
St. Louis Car Co.

Car Repairs.
General American Tank Car Corporation.
Pressed Steel Car Co.
St. Louis Car Co.
Tennessee Coal, Iron & Railroad Co.

Car Retarder Systems.
General Railway Signal Co.
Union Switch & Signal Co.

Car Siding — (See Siding, Car, etc.).

Cars, Baggage.
Brill Co., The J. G.
Pressed Steel Car Co.
St. Louis Car Co.

Cars, Ballast.
Bethlehem Steel Co.
General American Tank Car Co.
Mt. Vernon Car Mfg. Co.
Pressed Steel Car Co.
Western Wheeled Scraper Co.

Cars, Caboose, Coal & Stock.
Mt. Vernon Car Mfg. Co.

Cars, Convertible.
Mt. Vernon Car Mfg. Co.

Cars, Dump.
Bethlehem Steel Co.
Bettendorf Co., The.
Mt. Vernon Car Mfg. Co.
Pressed Steel Car Co.
Western Wheeled Scraper Co.

Cars, Flat, Narrow Gauge.
Bettendorf Co., The.
Pressed Steel Car Co.
Western Wheeled Scraper Co.

Cars, Freight.
Bethlehem Steel Co.
Bettendorf Co., The.
General American Tank Car Corp.
Mt. Vernon Car Mfg. Co.
Pressed Steel Car Co.
Pullman Car & Mfg. Co.

Cars, Freight (New and Repaired).
Bethlehem Steel Co.
Bettendorf Co., The.
General American Tank Car Corp.
Pressed Steel Car Co.

Cars, Gasoline-Electric.
Brill Co., The J. G.
Electro-Motive Co.
St. Louis Car Co.

Cars, Gasoline Motor.
Brill Co., The J. G.

Cars, Hand & Push.
Fairbanks-Morse & Co.

Cars, Industrial.
Bethlehem Steel Co.
Brill Co., The J. G.
General American Tank Car Corp.
Pressed Steel Car Co.
Western Wheeled Scraper Co.

Cars, Motor.
Fairbanks-Morse & Co.

Cars, Motor Inspection.
Fairbanks-Morse & Co.

Cars, Oil Electric.
Westinghouse Elec. & Mfg. Co.

Cars, Ore.
Brill Co., The J. G.
General American Tank Car Corp.
Pressed Steel Car Co.

Cars, Passenger.
Bethlehem Steel Co.
Brill Co., The J. G.
Electro-Motive Co.
Pressed Steel Car Co.
Pullman Car & Mfg. Corp.

Cars, Power Units.
Brill Co., The J. G.
Electro-Motive Co.

Cars, Quarry.
Pressed Steel Car Co.
Western Wheeled Scraper Co.

Cars, Rebuilt and Repaired.
Bettendorf Co., The.
General American Tank Car Corp.
Mt. Vernon Car Mfg. Co.
Pressed Steel Car Co.
Western Wheeled Scraper Co.

Cars, Refrigerator.
General American Tank Car Co.
Mt. Vernon Car Mfg. Co.
Pressed Steel Car Co.

Cars, Second-Hand.
Pressed Steel Car Co.
Western Wheeled Scraper Co.

Cars, Self-Propelled Passenger.
Brill Co., The J. G.
Electro-Motive Co.
General Electric Co.
Pullman Car & Mfg. Corp.
Westinghouse Elec. & Mfg. Co.

Cars, Spreader.
Western Wheeled Scraper Co.

Cars, Tank.
Bethlehem Steel Co.
General American Tank Car Corp.
Indian Refining Co.
Pressed Steel Car Co.

Cars, Dump.
Western Wheeled Scraper Co.

Castings, Alloy Steel.
Symington Co., The.
Union Spring & Mfg. Co.

Castings, Brass and Bronze.
Baldwin Locomotive Works, The.
General Railway Signal Co.
Magnus Co., Inc.
National Bearing Metals Corp.
Union Switch & Signal Co.

Castings, Gray Iron.
American Brake Shoe & Foundry Co.
American Locomotive Co.
Baldwin Locomotive Works.
General Railway Signal Co.
Locomotive Finished Material Co.
Mt. Vernon Car Mfg. Co.
Ramapo Ajax Corp.
Union Switch & Signal Co.

Castings, Gun Iron.
Hunt-Spiller Mfg. Corp.

Castings, Iron & Steel.
Baldwin Locomotive Works, The.
Industrial Brownhoist Corp.

Castings, Malleable Iron.
Buckeye Steel Castings Co.
Buffalo Brake Beam Co.
Chicago Railway Equipment Co.
Fort Pitt Malleable Iron Co.
National Malleable & Steel Castings Co.
P & M Company, The.
Pressed Steel Car Co.
Symington Co., The.
Universal Draft Gear Attachment Co.

Castings, Monel Metal.
International Nickel Co., The.

Castings, Steel.
Allegheny Steel Co.
American Locomotive Co.
American Steel Foundries.
Bethlehem Steel Co.
Bettendorf Co., The.
Birdsboro Steel Foundry & Mach. Co.
Buckeye Steel Castings Co.
General Steel Castings Corp.
Gould Coupler Co., The.
McConway & Torley Co.
Midvale Co., The.
National Malleable & Steel Castings Co.
Pressed Steel Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.
Union Steel Casting Co.
Universal Draft Gear Attachment Co.

Castings, Steel Loco.
Birdsboro Steel Foundry & Machine Co.
General Steel Castings Corp.
Gould Coupler Co., The.
Ohio Steel Foundry Co., The.
Standard Steel Works Co.
Union Steel Casting Co.

Castings, Steel Vanadium.
Birdsboro Steel Foundry & Machine Co.
Brill Co., The J. G.
Ohio Steel Foundry Co., The.
Standard Steel Works Co.
Union Steel Casting Co.

Catchbasins, Iron.
Armco Culvert Mfrs. Assoc.

Cellers, Engine Truck.
Ardco Mfg. Co.

Cement Car, Asphalt.
Lehon Co., The.
Sherwin-Williams Co.

Cement, High Temperature.
Carey Co., Philip, The.
Johns-Manville Corp.

Cements, Asbestos and Magnesia.
Carey Co., Philip, The.

Center Plates—(See Bearings, Center).

Center Sills.
Bettendorf Co., The.
Bradford Corporation.

Chain, Monel Metal.
International Nickel Co., The.

Chemicals.
Bird-Archer Co., The.
Dearborn Chemical Co.
Hunt Co., Robert W.

Chemicals, Boiler.
Bird-Archer Co., The.
Dearborn Chemical Co.

Chemicals, Cleaning.
Oakite Products, Inc.
Dearborn Chemical Co.

Chemists.
Bird-Archer Co., The.
Dearborn Chemical Co.
Hunt Co., Robert W.
Pittsburgh Testing Laboratory.

Chromium Plating.
Worthington Pump & Machinery Corp.

Chucks, Lathe.
Ryerson & Son, Jos. T.

Cinder Handling Plants.
Roberts & Schaefer Co.

Circuit Breakers.
General Electric Co.
Union Switch & Signal Co.
Westinghouse Elec. & Mfg. Co.

Clamps, Forging.
Ryerson & Son, Jos. T.

Clamps, Guard Rail.
O. & C. Co., The.
Westinghouse Air Brake Co.

Clamps, Hose.
Ingersoll-Rand Co.
National Malleable & Steel Castings Co.
Vapor Car Heating & Lighting Co.
Westinghouse Air Brake Co.

Clamps, Pipe.
Franklin Railway Supply Co., Inc.
National Malleable & Steel Castings Co.

Clamps, Rail Cutting.
Oxweld Railroad Service Co., The.

Classification Yard Systems.
General Railway Signal Co.
Union Switch & Signal Co.

Cleaners, Aircraft.
Dearborn Chemical Co.
Oakite Products Inc.

Cleaners, Air Pump.
Dearborn Chemical Co.
Oakite Products Inc.
Westinghouse Air Brake Co.

Cleaners, Bus & Truck.
Dearborn Chemical Co.
Oakite Products, Inc.

Cleaners, Car.
Dearborn Chemical Co.
Oakite Products, Inc.

Cleaners, Flue.
Ryerson & Son, Jos. T.

Cleaners, General.
Dearborn Chemical Co.
Oakite Products, Inc.

Cleaners, Locomotive.
Dearborn Chemical Co.
Oakite Products, Inc.

Cleaners, Metal.
Dearborn Chemical Co.
Oakite Products, Inc.

Clips, Wire Rope.
American Steel & Wire Co.

Coach and Coach Yard Steam Joints—(See Joints, etc.)

Coaches, Motor.
American Car & Foundry Motors Co.
Dodge Motor Truck Corp.
International Harvester Co.
White Co., The.

Coaches, SecondHand.
Hyman-Michaels Co.

Coal, Ore & Ash Handling Machinery.
Industrial Brownhoist Corp.
Milwaukee Electric Crane & Hoist Corp.
Orton Crane & Shovel Co.
Roberts & Schaefer Co.

Coal Pushers.
Standard Stoker Co.

Coaling Stations.
American Bridge Co.
FairbanksMorse & Co.
Roberts & Schaefer Co.

Cocks, Angle.
Westinghouse Air Brake Co.

Cocks, Blow-Off.
Bird-Archer Co., The.

Cocks, Cylinder.
Prime Manufacturing Co., The.

Columns, Water.
Prime Manufacturing Co. The.

Combination Crane Pile Drivers.
Industrial Brownhoist Corp.

Compounds, Boiler.
Dearborn Chemical Co.
Bird-Archer Co., The.

Compounds, Cleaning.
Dearborn Chemical Co.
Oakite Products, Inc.

Compounds, Cutting.
Dearborn Chemical Co.
Oakite Products, Inc.

Compounds, Grinding.
Dearborn Chemical Co.
Oakite Products, Inc.

Compounds, Paint Removing.
Oakite Products, Inc.

Compounds, Rust Proofing.
Dearborn Chemical Co.
Oakite Products, Inc.

Compressors, Air.
Ingersoll-Rand Co.
New York Air Brake Co.
Westingnouse Air Brake Co.
Worthington Pump & Machinery Corp.

Concrete Floor Slabs.
Federal American Cement Tile Co.

Concrete Reinforcement.
American Steel & Wire Co.
Carnegie Steel Co.
Ryerson & Son, Jos. T.

Concrete Roofing, Tile.
Federal American Cement Tile Co.

Condensers.
Ingersoll-Rand Co.

Condensing Apparatus.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.

Conduit, Rigid.
Aluminum Co. of America.

Conduits, Metallic Flexible.
Barco Mfg. Co.
Franklin Railway Supply Co., Inc.
Graybar Electric Co.
Vapor Car Heating Co., Inc.

Conduit, Underground.
Graybar Electric Co.
Johns-Manville Corp.

Connections, Lever.
National Malleable & Steel Castings Co.

Connections, Truck.
National Malleable & Steel Castings Co.

Connections, Truck Lever.
Schaefer Equipment Co.

Contraction Joint.
General Railway Signal Co.

Control Devices, Train Speed.
Union Switch & Signal Co.

Control, Locomotive.
Valve Pilot Co.

Controllers, Electric.
General Electric Co.
Westinghouse Electric & Mfg. Co.

Conveying Machinery.
American Bridge Co.
Industrial Brownhoist Corp.
Milwaukee Electric Crane & Hoist Corp.
Orton Crane & Shovel Co.

Corrugated Sheet.
Aluminum Co. of America.

Conveyor, Ash—(See Coal, Ore and Ash Handling Mach.).

Coupler Pockets—(See Draft Yokes).

Coupler Yokes.
Bettendorf Co., The.
Gould Coupler Co.
Symington Co., The.

Couplers.
American Steel Foundries.
Buckeye Steel Castings Co.
Franklin Railway Supply Co., Inc.
Gould Coupler Co., The.
McConway & Torley Co.
National Malleable & Steel Castings Co.
Standard Coupler Co.
Westinghouse Air Brake Co.

Couplings, Hose.
Fort Pitt Malleable Iron Co.
Gold Car Heating & Lighting Co.
Ingersoll-Rand Co.
Vapor Car Heating Co., Inc.
Westinghouse Air Brake Co.

Cranes, Ballast Cleaning.
American Hoist & Derrick Co.
Industrial Brownhoist Corp.
Ohio Locomotive Crane Co.

Cranes, Barge.
Industrial Brownhoist Corp.
Ohio Locomotive Crane Co.

Cranes, Bracket.
Shephard-Niles Crane & Hoist Corp.

Cranes, Crawler.
American Hoist & Derrick Co.
Industrial Brownhoist Corp.
Orton Crane & Shovel Co.

Cranes, Crawling Shovels and Draglines.
Industrial Brownhoist Corp.
Orton Crane & Shovel Co.

Cranes, Diesel.
Industrial Brownhoist Corp.
Ohio Locomotive Crane Co.

Cranes, Electric Traveling.
Industrial Brownhoist Corp.
Milwaukee Electric Crane & Hoist Corp.

Cranes, Gantry.
Industrial Brownhoist Corp.
Milwaukee Electric Crane & Hoist Corp.
Ohio Locomotive Crane Co.
Orton Crane & Shovel Co.
Shephard-Niles Crane & Hoist Corp.

Cranes, Gasoline.
Industrial Brownhoist Corp
Ohio Locomotive Crane Co.

Cranes, Grab Bucket.
Milwaukee Electric Crane & Hoist Corp.

Cranes, Handpower.
Industrial Brownhoist Corp.
Shephard-Niles Crane & Hoist Corp.

Cranes, Jib.
Industrial Brownhoist Corp.
Milwaukee Electric Crane & Hoist Corp.
Worthington Pump & Machinery Corp.

Cranes, Locomotive.
Industrial Brownhoist Corp.
Ohio Locomotive Crane Co.
Orton Crane & Shovel Co.

Cranes, Overhead.
Industrial Brownhoist Corp.
Milwaukee Electric Crane & Hoist Corp.
Shephard-Niles Crane & Hoist Corp.

Cranes, Pillar.
Industrial Brownhoist Corp.
Milwaukee Electric Crane & Hoist Corp.

Cranes, Portable.
Orton Crane & Shovel Co.

Cranes, Transfer.
Industrial Brownhoist Corp.
Milwaukee Electric Crane & Hoist Corp.

Cranes, Traveling.
Milwaukee Electric Crane & Hoist Corp.
Shephard-Niles Crane & Hoist Corp.

Cranes, Wharf.
Industrial Brownhoist Corp.
Ohio Locomotive Crane Co.

Cranes, Wrecking.
Industrial Brownhoist Corp.
Orton Crane & Shovel Co.

Crank Pins — (See Pins, Crank).

Creosote.
American Creosoting Co.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
International Creosoting & Constr. Co.
National Lumber & Creosoting Co.

Creosote, Wood Preservative Treatment.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
National Lumber & Creosoting Co.

Cribbing Units.
Federal American Cement Tile Co.

Cross Arms, Treated.
American Creosoting Co.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
Curtin-Howe Corp.
Graybar Electric Co.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.

Cross Ties, Treated.
American Creosoting Co.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
Curtin-Howe Corp.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.

Cross Ties, Steel.
Bethlehem Steel Co.

Crossheads & Shoes.
Baldwin Locomotive Wks.
Barco Mfg. Co.
International Creosoting & Construction Co.

Crossing Signals & Signs.
Railroad Supply Co.

Crossings—(See Frogs and Crossings).

Crossings, Pavement.
Carey Co., The Philip.

Crushers, Coal.
American Sheet & Tin Plate Co.
Orton Crane & Shovel Co.

Culverts.
Armco Culvert Mfrs. Assoc.
Republic Steel Corp.
Toncan Culvert Manufacturers' Association.

Culverts, Corrugated Iron
Armco Culvert Manufacturers' Association.
Republic Steel Corp.

Culverts, Part Circle
Armco Culvert Manufacturers Association

Culverts, Treated.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
National Lumber & Creosoting Co.
Southern Wood Preserving Co.

Cups, Oil.
New York Air Brake Co.
Prime Manufacturing Co., The.
Westinghouse Air Brake Co.

Curtain Material, Car.
Ryerson & Son, Jos. T.

Curtains, Cab.
Lebon Co., The.

Cutting and Welding Apparatus.
Electric Railweld Service Corp.
Oxweld Railroad Service Co.
Westinghouse Electric & Mfg. Co.

Cut-Off Indicators and Recorders.

Cylinder Parts, Finished and Rough
Locomotive Finished Material Co.
National Tube Co.
Valve Pilot Co.

Cylinders, Air Brake.
Westinghouse Air Brake Co.

Cylinders, Cast Steel Locomotive.
General Steel Castings Corp.

Cylinders, Locomotive
Locomotive Finished Material Co.
Union Steel Casting Co.

Deoxidizers.
Q & C Co., The.
Vanadium Corp. of America.

Derricks.
Industrial Brownhoist Corp.

Diesel Electric Power Plants.
Fairbanks-Morse & Co.
Westinghouse Elec. & Mfg. Co.

Dirt Collectors.
New York Air Brake Co.
Westinghouse Air Brake Co.

Disinfectants.
West Disinfecting Co.

Dispatching Systems.
General Railway Signal Co.
Union Switch & Signal Co.

Ditching Machinery.
Industrial Brownhoist Corp.
Orton Crane & Shovel Co.

Door Fixtures — (See Fixtures, Car Door).

Doors, Car.
Camel Sales Co.
Chicago Railway Equipment Co.
Miner, W. H.
Wine Railway Appliance Co.

Doors, Locomotive Firebox.
Franklin Railway Supply Co., Inc.

Doors, Rolling, Steel.
Kinnear Mfg. Co.

Draft Arms.
American Steel Foundries.
Birdsboro Steel Foundry & Machine Co.
Bradford Corporation.
Symington Co., The.
Universal Draft Gear Attachment Co.

Draft Gear Attachments.
Symington Co., The

Draft Gears.
American Steel Foundries.
Bradford Corporation.
Cardwell-Westinghouse Co.
Edgewater Steel Co.
Fort Pitt Malleable Iron Co.
Miner, W. H.
National Malleable & Steel Castings Co.
Standard Coupler Co.
Union Draft Gear Co.
Universal Draft Gear Attachment Co.

Draft Yokes.
American Steel Foundries.
Bettendorf Co., The.
Buckeye Steel Castings Co.
Gould Coupler Co., The.
McConway & Torley Co.
Miner, W. H.
Mt. Vernon Car Mfg. Co.
National Malleable & Steel Castings Co.
Pressed Steel Car Co.
Steel Car Forge Co.
Symington Co. The.
Universal Draft Gear Attachment Co.

Drainage Gates, Automatic
Armco Culvert Mfrs. Assoc.
Republic Steel Corp.

Drains, Perforated Iron.
Republic Steel Corp.

Drawbar Centering Device.
Gould Coupler Co., The.
Miner, W. H.

Drawbars, Unit Safety.
Franklin Railway Supply Co., Inc.
Industrial Brownhoist Corp.

Dredging Machinery.
Industrial Brownhoist Corp.

Drilling Machines.
Sellers & Co., Inc., Wm.

Drilling Machines, Bonding.
Railroad Supply Co.

Drilling Machines, Pneumatic
Ingersoll-Rand Co.

Drilling Machines, Rock.
General Electric Co.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.

Drilling Machines, Upright and Radial.
Ryerson & Son, Joseph T.
Sellers & Co., Inc., Wm.

Drills.
Ingersoll-Rand Co.

Drills, Close Corner.
Ingersoll-Rand Co.

Drills, Concrete.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.

Drills, Steel Rock and Steel Sharpened.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.

Drills, Track & Bending.
Bird-Archer Co., The.
Ingersoll-Rand Co.

Drive Gas Electric Coaches.
General Electric Co.

Drive Gas Electric Locomotives
Westinghouse Electric & Mfg. Co.

Driving Boxes (Extended Main).
Franklin Railway Supply Co., Inc.

Drop Door Mechanism.
Wine Railway Appliance Co.

Dynamos—(See Generators, Electric).

Electrical Cable Accessories.
General Electric Supply Corp.

Electric Cables.
American Steel & Wire Co.
Anaconda Wire & Cable Co.
General Electric Supply Corp.

Electrical Instruments.
Electric Service Supplies Co.
Railroad Supply Co.
Westinghouse Elec. & Mfg. Co.

Electrical Supplies.
General Electric Co.
General Electric Supply Corp.
Graybar Electric Co.
Westinghouse Elec. & Mfg. Co.

Electrification. Railroad.
Battey & Kipp.
General Electric Co.
United Engineers & Constructors, Inc.
Westinghouse Elec. & Mfg. Co.

Electric Heaters.
General Electric Supply Corp.

Electrical Insulation.
General Cable Corp.
General Electric Supply Corp.

Electrical Porcelain Insulators.
General Electric Supply Corp.

Electric Motors.
General Electric Supply Corp.

Electric Rivet Heaters.
General Electric Supply Corp.

Electric Switches.
General Electric Supply Corp.

Enamels.
Lowe Bros. Co., The.
Sherwin-Williams Co.

End Frames, Cast Steel, Passenger Car.
General Steel Castings Corp.

Ends, Steel.
Hutchins Car Rfg. Co.
Union Metal Products Co.

Engineers, Consulting, Civil, Elec., Hydraulic. Mechanical.
Battey & Kipp.
Hunt Co., Robt. W.
Muhlfeld, John E.
United Engineers & Constructors, Inc.

Engineers, Contracting.
Battey & Kipp.
United Engineers & Constructors, Inc.

Engineers and Contractors.
Battey & Kipp.
Hunt Co., Robert W.
Muhlfeld, John E.
United Engineers & Constructors, Inc.

Engineers, Construction.
Battey & Kipp.
Roberts & Schaefer Co.
United Engineers & Constructors, Inc.

Engineers and Contractors, Elec., Hydraulic, Mech.
Battey & Kipp.
Hunt Co., Robert W.
Muhlfeld, John E.
Roberts & Schaefer Co.

Engineers, Inspecting.
Gulick-Henderson Co.
Hunt Co., Robert W.
Muhlfeld, John E.
Pittsburgh Testing Laboratory.
United Engineers & Constructors, Inc.

Engineers, Valuation.
Hunt Co., Robert W.
United Engineers & Constructors, Inc.

Engines, Crude & Fuel Oil.
Fairbanks-Morse & Co.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.

Engines, Diesel.
Worthington Pump & Machinery Corp.

Engines, Gas.
Brill Co., The J. G.
Worthington Pump & Machinery Corp.

Engines, Gas & Gasoline.
American Car & Foundry Motors Co.
Fairbanks-Morse & Co.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.

Engines, Hoisting.
Industrial Brownhoist Corp.
Orton Crane & Shovel Co.

Excavators.
Industrial Brownhoist Corp.

Exhaust & Heater Pipe.
Union Asbestos & Rubber Co.

Exhaust & Ventilating Fans.
General Electric Supply Corp.

Expanders, Tube.
Ryerson & Son, Joseph T.

Fans, Exhaust & Ventilating.
General Electric Co.
Graybar Electric Co.
Westinghouse Elec. & Mfg. Co.

Fasteners, Car Door.
Camel Sales Co.
Fort Pitt Malleable Iron Co.
Miner, W. H.
National Malleable & Steel Castings Co.

Feed Water Heater Systems.
Bird-Archer Co., The.
Worthington Pump & Machinery Corp.

Fencing Wire—(See Wire, Fence).

Fence Posts, Treated.
American Steel & Wire Co.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
Curtin-Howe Corp.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.

Ferro Alloys.
Vanadium Corp. of America.

Ferro, Chromium.
Vanadium Corp. of America.

Ferro, Molybdenum.
Vanadium Corp. of America.

Ferro, Silicon.
Vanadium Corp. of America.

Ferro, Tungsten.
Vanadium Corp. of America.

Ferro, Vanadium.
Vanadium Corp. of America.

Filters, Air.
New York Air Brake Co.
Westinghouse Air Brake Co.

Filters, Water & Industrial.
Graver Tank & Mfg. Corp.

Filtration Plants (Water).
Graver Tank & Mfg. Corp.

Fireboxes.
American Locomotive Co.
Baldwin Locomotive Works.

Fire Fighting & Protection Equipment.
Johns-Manville Corp.

Fittings, Air Brakes.
Westinghouse Air Brake Co.

Fittings, Steam.
Vapor Car Heating Co., Inc.

Fixtures, Car Door.
Camel Sales Co.
Chicago Railway Equipment Co.
Miner, W. H.
National Malleable & Steel Castings Co.

Flangers, Snow.
Q & C Co., The.

Floodlights.
General Electric Supply Corp.
Graybar Electric Co.
Oxweld Railroad Service Co.
Pyle-National Co.
Symington Co., The.
Westinghouse Elec. & Mfg Co.

Floodlights, Acetylene.
Oxweld Railroad Service Co., The.

Flooring.
Carey & Co., Philip, The.
Johns-Manville Corp.

Flooring, Car.
Tuco Products Corp.

Flooring, Coach.
Tuco Products Corp.

Flooring, Composition.
Johns-Manville Corp.
Tuco Products Corp.

Flooring, Treated.
Central Coal & Coke Co.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
Curtin-Howe Corp.
National Lumber & Creosoting Co.

Floor Plates, Steel.
Carnegie Steel Co.
Illinois Steel Co.
Inland Steel Company

Floor Slabs, Concrete.
American Cement Tile Mfg. Co.

Flue Cleaners—(See Cleaners, Flue).

Flue Cutters—(See Cutters, Flue).

Flues, Boiler—(See Tubes, Boiler).

Flue Shop Equipment.
Ryerson & Son, Joseph T.

Forges, Rivet Heating.
Ryerson & Son, Joseph T.

Forging Hammers.
Industrial Brownhoist Corp.

Forgings.
American Bridge Co.
American Steel Foundries.
Baldwin Locomotive Works, The.
Bethlehem Steel Co.

Brill Co., The J. G.
Carnegie Steel Co.
Edgewater Steel Co.
General Railway Signal Co.
Gould Coupler Co., The.
Illinois Steel Co.
Midvale Co., The.
Mt. Vernon Car Mfg. Co.
Neely Nut & Bolt Co.
Pressed Steel Car Co.
Standard Steel Works Co.
Steel Car Forge Co.
Universal Draft Gear Attachment Co.

Forgings, Drop.
Baldwin Locomotive Works, The.
Brill Co., The J. G.
General Railway Signal Co.
Steel Car Forge Co.
Union Switch & Signal Co.

Forgings, Monel Metal.
International Nickel Co., The.

Foundry Supplies.
Bird-Archer Co., The.

Frames, Cast Steel Locomotive
General Steel Castings Corp.

Frames, Locomotive.
American Steel Foundries.
American Locomotive Co.
Baldwin Locomotive Works.
Birdsboro Steel Foundry & Machine Co.
Ohio Steel Foundry Co., The.
Union Steel Casting Co.

Frames, Truck.
American Locomotive Co.
American Steel Foundries.
Baldwin Locomotive Works
Bettendorf Co., The.
Birdsboro Steel Foundry & Machine Co.
Buckeye Steel Castings Co.
Brill Co., The J. G.
Franklin Railway Supply Co., Inc.
Gould Coupler Co., The.
Ohio Steel Foundry Co., The.
Pressed Steel Car Co.
Pyle-National Co.
Symington Co., The.

Frames, Vanadium.
American Locomotive Co.
Baldwin Locomotive Works
Birdsboro Steel Foundry & Machine Co.
Union Steel Casting Co.

Frogs and Crossings.
Bethlehem Steel Co.
Ramapo Ajax Corp.

Fulcrums, Brake Beam.
American Steel Foundries.
Brill Co., The J. G.
Buffalo Brake Beam Co.
Chicago Railway Equipment Co.
National Malleable & Steel Castings Co.

Furnaces, Electric.
General Electric Co.
Westinghouse Elec. & Mfg Co.

Furnaces, Gasoline.
Railroad Supply Co.

Furnaces, Rivet Heating—(See Forges, Rivet Heating).

Furniture.
Aluminum Co. of America

Gage Testers—(See Testers, Gage).

Gages, Air.
Westinghouse Air Brake Co.

Gages, Oxy-Acetylene.
Oxweld Railroad Service Co., The.

Gages, Steam.
Ashton Valve Co.

Gages, Tire.
Schrader's Son, Inc., A.

Gages, Wheel Press Recording.
Ashton Valve Co.

Gaskets.
Westinghouse Air Brake Co.

Gasoline.
Ethyl Gasoline Corp.

Gear Blanks, Rolled Steel.
Edgewater Steel Co.
Standard Steel Works Co.

Gears and Pinions.
American Steel Foundries.
Westinghouse Elec. & Mfg. Co.

Gears, Silent.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Gears, Valve — (See Valve Gears).

Generators, Acetylene.
Oxweld Railroad Service Co.

Generators, Electric.
Fairbanks-Morse & Co.
General Electric Co.
Graybar Electric Co.
Sunbeam Electric Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Goggles, Welding.
Oxweld Railroad Service Co., The.
Sunbeam Electric Mfg. Co.

Graders, Elevating.
Western Wheeled Scraper Co.

Grapples, Wood.
Industrial Brownhoist Corp.

Grate Bars.
Q & C Co., The.

Grate Shakers, Automatic.
Franklin Railway Supply Co., Inc.

Grates.
Firebar Corp.

Grease Forming Machines.
Franklin Railway Supply Co., Inc.

Grey Iron.
American Brake Shoe & Foundry Co.

Grinders, Internal.
Micro Machine Co.

Grinders, Portable Crank Pin.
Micro Machine Co.

Grinding Machines.
Sellers & Co., Inc., Wm.

Grinding Machines, Portable.
Ingersoll-Rand Co.
Ryerson & Son, Inc., Joseph T.

Guard Rails, Treated.
Curtin-Howe Corp.
International Creosoting & Construction Co.

Guard Rails, Foot Guard.
Q & C Co., The.

Guard Rails (One Piece).
Bethlehem Steel Co.
Ramapo Ajax Corp.

Guard Switch Point.
Q & C Co., The.

Guards, Cattle.
American Bridge Co.

Guards, Dust.
Gould Coupler Co., The.
Symington Co., The.

Hair Felt.
Johns-Manville Corp.

Hammers, Pneumatic.
Ingersoll-Rand Co.

Hammers, Riveting.
Ingersoll-Rand Co.

Hammers, Steam.
Industrial Brownhoist Corp.
Sellers & Co., Inc., Wm.

Hand Brakes—(See Brakes, Hand).

Hangers, Ball Bearing.
S. K. F. Industries, Inc.

Hand Rails & Fittings.
Aluminum Co. of America.

Hangers, Bottom Rod Safety.
Chicago Railway Equipment Co.

Hangers, Car Door—(See Fixtures, Car Door).

Headgates, Sliding
Armco Culvert Manufacturers Association

Headlight Repair Parts, Electric.
Electric Service Supplies Co.
Pyle-National Co.
Sunbeam Electric Mfg. Co.

Headlights, Electric.
General Electric Co.
Pyle-National Co., The.
Sunbeam Electric Mfg. Co.
Westinghouse Electric & Mfg. Co.

Headlights, Reflectors & Cases.
Pyle-National Co.
Sunbeam Electric Mfg. Co.

Heaters, Electric.
Gold Car Heating & Lighting Co.
Westinghouse Electric & Mfg. Co.

Heaters, Feedwater.
Graver Tank & Mfg. Corp.

Heaters, Feedwater Locomotive.
Coffin Co., Jr., The J. S.
Superheater Company, The.
Worthington Pump & Machinery Corp.

Heaters, Feed Water, Stationary.
Brill Co., The J. G.
Worthington Pump & Machinery Corp.

Heating & Ventilating Apparatus.
Gold Car Heating & Lighting Co.
Vapor Car Heating Co., Inc.
Westinghouse Electric & Mfg. Co.

Heating Equipment, Car.
Gold Car Heating & Lighting Co.
Vapor Car Heating Co., Inc.
Wine Railway Appliance Co.

Heating Systems, Car (Electric and Steam).
Gold Car Heating & Lighting Co.
Vapor Car Heating Co., Inc.
Wine Railway Appliance Co.

High Temperature Cements.
Carey & Co., Philip, The.

Highway Crossing Protection Devices.
American Bridge Co.
Franklin Railway Supply Co., Inc.
Griswold Signal Co.
Railroad Supply Co.

Hoists, Chain.
Milwaukee Electric Crane & Hoist Corp.
Ryerson & Son, Jos. T.

Hoists, Electric.
Milwaukee Electric Crane & Hoist Corp.

Hoists, Pneumatic.
Ingersoll-Rand Co.

Hoisting Machinery.
Industrial Brownhoist Corp.
Milwaukee Electric Crane & Hoist Corp.
Orton Crane & Shovel Co.

Hooks, Wrecking.
National Malleable & Steel Castings Co.

Horns, Pneuphonic.
Westinghouse Air Brake Co.

Hose, Air, Steam, Etc.
Ingersoll-Rand Co.
Westinghouse Air Brake Co.
Worthington Pump & Machinery Corp.

Hose, Oxy-Acetylene.
Oxweld Railroad Service Co., The.

Hose, Tender.
Westinghouse Air Brake Co.

Incandescent Lamps.
General Electric Supply Corp.

Indicators, Speed & Cut-off.
Valve Pilot Co.

Ingots.
Birdsboro Steel Foundry & Machine Co.
Carnegie Steel Co.
Edgewater Steel Co.
Illinois Steel Co.
McConway & Torley Co.
Standard Steel Works Co.

Injectors, Exhaust Steam.
Sellers & Co., Inc., Wm.
Superheater Co., The.

Inspection of Material and Equipment—(See Engineers, Inspection).

Insulated Wire.
American Steel & Wire Co.
Anaconda Wire & Cable Co.
General Electric Supply Corp.

Insulation, Car.
Carey Co., Philip, The.
Wood Conversion Co.

Insulation, Car, Bldg.
Carey Co., Philip, The.
Johns-Manville Corp.
Lehon Co., The.
Tuco Products Corp.
Union Asbestos & Rubber Co.
Wood Conversion Co.

Insulation, Electrical.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Insulation, Exhaust & Heater Pipe.
Carey Co., Philip, The.
Johns-Manville Corp.
Tuco Products Corp.
Union Asbestos & Rubber Co.

Insulation, Heat.
Carey Co., Philip, The.
Miner, W. H.

Insulation Tape.
General Electric Supply Corp.

Insulators, Electrical, Porcelain.
Graybar Electric Co.
Westinghouse Elec. & Mfg. Co.

Interlocking Plant Equipment.
General Railway Signal Co.
Union Switch & Signal Co.

Iron Chain.
Falls Hollow Staybolt Co.
Lockhart Iron & Steel Co.
Ryerson & Son, Joseph T.

Iron, Charcoal.
Bethlehem Steel Co.
Ewald Iron Co.
Falls Hollow Staybolt Co.
Lockhart Iron & Steel Co.
Ryerson & Son, Joseph T.

Iron, Engine Bolt.
Lockhart Iron & Steel Co.
Ryerson & Son, Joseph T.

Iron, Forging Billets.
Lockhart Iron & Steel Co.

Iron, Hollow Staybolt.
Falls Hollow Staybolt Co.
Ryerson & Son, Joseph T.

Iron, Hollow Staybolt Bars.
Bethlehem Steel Co.
Falls Hollow Staybolt Co.
Ryerson & Son, Joseph T.

Iron, Pig.
Bethlehem Steel Co.

Iron, Refined.
Ewald Iron Co.
Falls Hollow Staybolt Co.
Lockhart Iron & Steel Co.
Reading Iron Co.
Ryerson & Son, Joseph T.

Iron, Staybolt — (See also Staybolts).
Ewald Iron Co.
Falls Hollow Staybolt Co.
Lockhart Iron & Steel Co.
Reading Iron Co.
Ryerson & Son, Joseph T.

Jacking, Locomotive.
Carey Co., Philip, The.

Jacking Method of Installing Pipe
Armco Culvert Manufacturers Association

Jacks, Smoke.
Carey Co., Philip, The.
Johns-Manville Corp.

Joints, Air Reservoir.
Barco Mfg. Co.
Franklin Railway Supply Co., Inc.

Joints, Blow Off Line (Roundhouse).
Barco Mfg. Co.
Franklin Railway Supply Co., Inc.

Joints, Coach and Coach Yard.
Barco Mfg. Co.
Franklin Railway Supply Co., Inc.

Joints, Flexible.
Franklin Railway Supply Co., Inc.
Vapor Car Heating Co., Inc.

Joints, Flexible Ball.
Barco Mfg. Co.

Joints, Rail.
American Steel Foundries.
Carnegie Steel Co.
Illinois Steel Co.
Q & C Co., The.
Rail Joint Co.
Union Switch & Signal Co.

Joints, Steam, Air & Liquid.
Barco Mfg. Co.
Franklin Railway Supply Co., Inc.
Vapor Car Heating Co., Inc.

Joints, Swing.
Barco Mfg. Co.
Vapor Car Heating Co., Inc.

Journal Boxes and Lids.
Allegheny Steel Co.
American Steel Foundries.
Brill Co., The J. G.
Gould Coupler Co., The.
Hunt-Spiller Mfg. Corp.
National Malleable & Steel Castings Co.
Pullman Car & Mfg. Corp.
Railway Steel Spring Co.
Symington Co., The.
Union Spring & Mfg. Co.

Journal Oilers, Car & Locomotive.
Ardco Mfg. Co.

Keys, Brake Shoe.
Bradford Corporation.
Buffalo Brake Beam Co.
Mt. Vernon Car Mfg. Co.
Steel Car Forge Co.
Union Spring & Mfg. Co.

Knuckles, Emergency.
Q & C Co., The.

Laboratories, Testing.
Hunt Co., Robert W.
Pittsburgh Testing Laboratory.

Lacquers.
General Electric Supply Corp.
Sherwin-Williams Co.

Ladders, Steel Car.
Wine Railway Appliance Co.

Lagging, Locomotive.
Carey & Co., Philip, The.
Johns-Manville Corp.

Lamps, Incandescent.
General Electric Co.
Graybar Electric Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Inspector's.
Oxweld Railroad Service Co., The.

Lath, Metal
Armco Railroad Sales Co.

Lathes, Axle.
Sellers & Co., Inc., Wm

Lathes, Engine.
Ryerson & Son, Joseph T

Lathes, Wheel.
Sellers & Co., Inc., Wm.

Lead, White.
National Lead Co.

Lighting Equipment, Car.
Electric Storage Battery Co.

Lighting Fixtures and Systems.
General Electric Supply Corp.
Graybar Electric Co.
Pyle-National Co.

Lighting Plants, Gas, Electric
Pyle-National Co., The.
Sunbeam Electric Mfg. Co.

Lightning Arresters.
General Electric Supply Corp.

Line Material.
Graybar Electric Co.
Westinghouse Elec. & Mfg. Co.

Lock Nuts—(See Nut Locks)

Locomotive Jacket Sheets.
Armco Railroad Sales Co.

Locomotive Water Conditioners
Bird-Archer Co., The.

Locomotives, Contractors.
American Locomotive Co.
Baldwin Locomotive Works.
Lima Locomotive Works.

Locomotives, Electric.
American Locomotive Co.
Baldwin Locomotive Works.
General Electric Co.
Lima Locomotive Works
Westinghouse Elec. & Mfg. Co.

Locomotives, Gasoline.
Baldwin Locomotive Works.
Lima Locomotive Works

Locomotives, Gas-Electric.
Brill Co., The J. G.
Electro-Motive Co.

Locomotives, Geared.
Lima Locomotive Works.

Locomotives, Industrial.
American Locomotive Co.
Baldwin Locomotive Works.
General Electric Co.
Lima Locomotive Works.
Westinghouse Elec. & Mfg. Co.

Locomotives, Mine.
American Locomotive Co.
Baldwin Locomotive Works.
General Electric Co.
Lima Locomotive Works.
Westinghouse Elec. & Mfg. Co.

Locomotives, Oil Engine, Electric Driven.
American Locomotive Co.
Baldwin Locomotive Works.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Elec. & Mfg. Co.
Whitcomb Co., Geo. D. The.

Locomotives, Rebuilt.
American Locomotive Co.
Locomotives, Repair Parts.
American Locomotive Co.
Baldwin Locomotive Works.
Lima Locomotive Works.
Locomotives, Steam.
American Locomotive Co.
Baldwin Locomotive Works.
Lima Locomotive Works.
Locomotive Stokers.
Standard Stoker Co.
Locomotive Valve Pilot.
Valve Pilot Co.
Lubricators, Driving Box.
Franklin Railway Supply Co., Inc.
Lubricators, Piston Rod.
Q & C Co., The.
Lumber, Asbestos.
Carey & Co., Philip, The.
Johns-Manville Corp.
Lumber, Treated.
American Creosoting Co.
Central Coal & Coke Co.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
Curtin-Howe Corp.
Industrial Lumber & Creosoting Co.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.
Machinery, Hydraulic.
Birdsboro Steel Foundry & Mach. Co.
Machine Screws, Monel Metal
International Nickel Co., The.
Magnets, Lifting.
Industrial Brownhoist Corp.
Electro Metallurgical Sales Corp.
Mechanical Draft Apparatus—(See Heating and Vent. App.).
Mechanical Stokers.
Standard Stoker Co.
Melters, Snow, Electric.
Q & C Co., The.
Metallic Flexible Conduit.
General Electric Supply Corp.
Meters, Water & Oil.
Worthington Pump & Machinery Corp.
Milling Machines, Planer Type.
Sellers & Co., Inc., Wm.
Milling Machines, Plain and Universal.
Ryerson & Son, Joseph T.
Milling Machines, Portable Frame Jaw.
Micro Machine Co.
Mohair Upholstery Velvets.
Chase & Co., L. C.
Massachusetts Mohair Plush Co.
Molybdenum Metal.
Vanadium Corp. of America.
Monel Metal, Rods, Sheets, Tubes, Wire, etc.
International Nickel Co., The.
Motors, Electric.
Fairbanks-Morse & Co.
General Electric Co.
Graybar Electric Co.
Westinghouse Elec. & Mfg. Co.
Motors & Generators.
Fairbanks-Morse & Co.
Moulding.
Aluminum Co. of America.
Multiple V Belt Drives.
Worthington Pump & Machinery Corp.
Nails.
American Steel & Wire Co.
Reading Iron Co.
Ryerson & Son, Joseph T.
Nipples, Air Hose.
Prime Manufacturing Co.
Nozzles, Exhaust.
Franklin Railway Supply Co., Inc.
Nozzles, Oxy-Acetylene Cutting.
Oxweld Railroad Service Co., The.
Nuts—(See Bolts and Nuts).
Nut Locks.
Dardelet Threadlock Corp.
Grip Nut Co.
Nuts, Tank Hose.
Prime Manufacturing Co., The.
Office Appliances.
Remington-Rand Business Service.
Oils, Diesel Engine
Vacuum Oil Co.
Oil, Dynamo
Vacuum Oil Co.
Oil-Electric Locomotives.
American Locomotive Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Elec. & Mfg. Co.
Oil Filtering & Storage Systems.
Graver Tank & Mfg. Corp.
Oils & Greases, Engine
Vacuum Oil Co.
Oils & Greases, Lubricating
Vacuum Oil Co.
Oils & Greases, Motor
Vacuum Oil Co.
Oil, Linseed.
National Lead Co.
Oils, Locomotive Valve
Vacuum Oil Co.
Oil Plugs, Steam Chest.
Franklin Railway Supply Co., Inc.
Oil, Turbine
Vacuum Oil Co.
Oxy-Acetylene Apparatus.
Oxweld Railroad Service Co., The.
Oxygen.
Oxweld Railroad Service Co., The.
Packing.
Westinghouse Air Brake Co.
Packing, Air Pump.
Johns-Manville Corp.
Pilot Packing Co.
Union Asbestos & Rubber Co.
Westinghouse Air Brake Co.
Packing, Asbestos.
Packing, Cylinder and Valve Rmg.
Johns-Manville Corp.
Hunt-Spiller Mfg. Corp.
Locomotive Finished Material Co.
Westinghouse Air Brake Co.
Packing, Locomotive Cab Cock.
Johns-Manville Corp.
Union Asbestos & Rubber Co.
Packing, Ring Boiler.
Union Asbestos & Rubber Co.
Packing, Semi-Metallic.
Pilot Packing Co.
Central Alloy Steel Corp.
Packing, Sheet.
Johns-Manville Corp.
Union Asbestos & Rubber Co.
Packing, Soft.
Carey & Co., Philip, The
Johns-Manville Corp.
Pilot Packing Co.
Union Asbestos & Rubber Co.
Packing, Throttle.
Johns-Manville Corp.
Union Asbestos & Rubber Co.
Paint Burners, Acetylene.
Oxweld Railroad Service Co., The.
Paint, Metal Protective.
Lowe Bros. Co., The.
National Lead Co.
Sherwin-Williams Co.
Paint, Powder.
Aluminum Co. of America.
Paint Spraying Equipment.
De Vilbiss Mfg. Co., The.
Paints.
Lowe Bros. Co., The.
National Lead Co.
Sherwin-Williams Co.
Paper, Carbon.
Remington-Rand Business Service.
Paper, Sheathing.
Carey & Co., Philip, The.
Patterns, for Iron, Steel & Brass Castings.
Baldwin Locomotive Works, The.
Pavement Breakers.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.
Pickling Equipment, Monel Metal.
International Nickel Co., The.
Pile Drivers.
Industrial Brownhoist Corp.
Orton Crane & Shovel Co.
Piling, Treated.
American Creosoting Co.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
Curtin-Howe Corp.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Piling, Sheet Steel.
American Bridge Co.
Carnegie Steel Co.
Inland Steel Company
Piling, Wood.
National Lumber & Creosoting Co.
Pilot Beams, Cast Steel.
General Steel Castings Corp.
Gould Coupler Co., The.
Pilots, Cast Steel.
General Steel Castings Corp.
Locomotive Finished Material Co.
Pins, Air Brake & Clevis.
Champion Rivet Co.
Pins, Center.
Miner, W. H.
Pins, Coupler Knuckle.
Champion Rivet Co.
McConway & Torley Co.
National Malleable & Steel Castings Co.
Pins, Crank.
American Locomotive Co.
Baldwin Locomotive Works.
Miner, Inc., W. H.
Standard Steel Works Co.
Union Asbestos & Rubber Corp.
Pipe, Corrugated Iron
Armco Culvert Manufacturers Association
Pipe, Paved Invert
Armco Culvert Manufacturers Association
Pipe Coverings.
Carey & Co., Philip, The.
Johns-Manville Corp.
Keasby & Mattison Co.
Pipe Fittings—(See Fittings, Pipe).
Pipe, Metal Culvert.
Armco Railroad Sales Co
American Sheet & Tin Plate Co.
Republic Steel Corp.
Pipe, Perforated Iron
Armco Culvert Manufacturers Association
Pipe, Spiral Welded.
Armco Railroad Sales Co
Pipe, Steel Signal.
National Tube Co.
Pipe, Spiral Welded.
Armco Railroad Sales Co
Pipe, Wrought Iron.
Byers Co., A. M.
Reading Iron Co.
Planers, Plate.
Ryerson & Son, Jos. T.
Sellers & Co., Inc., Wm.
Plates.
Steel Car Forge Co.
Plates, Follower.
Steel Car Forge Co.
Plates, Boiler, Firebox—(See Steel Firebox).
Plates, Center—(See Bearings, Center).
Plates, Iron & Steel.
Armco Railroad Sales Co
Carnegie Steel Co.
Illinois Steel Co.
Inland Steel Co.
Ryerson & Son, Joseph T
Plate & Sheet Metal Work
Baldwin Locomotive Works, The.
Plates, Tie.
Illinois Steel Co.
Inland Steel Company.
Railroad Supply Co.
Tennessee Coal, Iron & Railroad Co.
Plates, Tin and Terne.
American Sheet & Tin Plate Co.
Platforms, Car.
Gould Coupler Co., The.
Standard Coupler Co.
Platforms, Cast Steel, Passenger Car.
General Steel Castings Corp.
Plows, Railroad and Grading.
Western Wheeled Scraper Co.
Plows, Snow.
American Locomotive Co.
Brill Co., The J. G.
Q & C Co., The.
Plush, Mohair.
Chase & Co., L. C.
Massachusetts Mohair Plush Co.
Pneumatic Tools.
Ingersoll-Rand Co.
Poles, Creosoted.
National Lumber & Creosoting Co.
Poles, Power Distribution.
National Lumber & Creosoting Co.
Poles, Preservatively Treated.
National Lumber & Creosoting Co.
Poles, Signal.
American Creosoting Co.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
Curtin-Howe Corp.
General Railway Signal Co.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.
Union Switch & Signal Co.
Poles, Steel Tubular.
Graybar Electric Co.
National Tube Co.
Poles, Telegraph.
National Lumber & Creosoting Co.
Poles, Transmission.
National Lumber & Creosoting Co.
Poles, Treated.
American Creosoting Co.
Central Coal & Coke Co.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
General Electric Supply Corp.
Curtin-Howe Corp.
Graybar Electric Co.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.
Poles, Wood
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Posts, Farm.
National Lumber & Creosoting Co.
Posts, Fence, Treated.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
Curtin-Howe Corp.
Inland Steel Co.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.
Posts, Highway.
National Lumber & Creosoting Co.
Posts, Steel Fence.
American Steel & Wire Co
Q & C Co., The.
Posts, Wood.
National Lumber & Creosoting Co.
Powder, Blasting—(See Explosives).
Powdered Coal Equipment.
Muhlfeld, John E.
Power Plants.
General Electric Co.
Muhlfeld, John E.
United Engineers & Constructors, Inc.
Westinghouse Elec. & Mfg. Co.
Power Transmission Supplies
Sellers & Co., Inc., Wm.
Preservatives, Wood.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
Curtin-Howe Corp.
National Lumber & Creosoting Co.
Presses, Flanging Hydraulic.
Birdsboro Steel Foundry & Machine Co.
Presses, Hydraulic.
Baldwin-Southwark Corp.
Birdsboro Steel Foundry & Machine Co.
Presses, Wheel.
Birdsboro Steel Foundry & Machine Co.
Sellers & Co., Inc., Wm.
Pulverizers, Coal — (See Crushers, Coal).
Pumping Stations.
Fairbanks-Morse & Co.
Pump Liners, Monel Metal.
International Nickel Co., The.
Pump Rods, Monel Metal.
International Nickel Co., The.
Pump Shafts, Monel Metal.
International Nickel Co., The.
Pumps, Hydraulic.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.
Pumps & Pumping Mchy.
Fairbanks-Morse & Co.
Ingersoll-Rand Co.
Westinghouse Air Brake Co.
Worthington Pump & Machinery Corp.
Poles, Creosoted.
National Lumber & Creosoting Co.
Pumps, Vacuum.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.
Punching and Shearing Machines.
Ryerson & Son, Joseph T
Pushers, Coal.
Standard Stoker Co.
Pyrometers, Superheated Steam.
Superheater Co., The.
Rail Anchors.
Bethlehem Steel Co.
P. & M. Co., The.
Rail-Bonds.
American Steel & Wire Co
General Electric Co.
General Railway Signal Co
Graybar Electric Co.
Railroad Supply Co.
Union Switch & Signal Co
Westinghouse Elec. & Mfg Co.
Rail Braces — (See Braces Rail).
Rail Reclamation Equipment
Ryerson & Son, Joseph T
Railroad Shops.
United Engineers & Constructors, Inc.
Railroad Structures — (See Engineers and Contractors: also Building)
Rail Splice Plates — (See Joints, Rail).
Rails.
Bethlehem Steel Co.
Carnegie Steel Co.
Illinois Steel Co.
Inland Steel Co.
Ryerson & Son, Joseph T.
Tennessee Coal, Iron & Railroad Co.
Thomson Rail Corp.
Railway Signals.
General Electric Supply Corp.
Rattan.
Hale-Kilburn Co.
Heywood-Wakefield Co.
Receivers, Air.
Ingersoll-Rand Co.
Westinghouse Air Brake Co.
Recorders, Speed & Cut-off.
Valve Pilot Co.
Rectifiers for Signal Work.
General Electric Co.
Railroad Supply Co.
Union Switch & Signal Co
Reducing Valves.
Vapor Car Heating Co., Inc.
Reflectors, Headlight.
Pyle-National Co., The.
Sunbeam Electric Mfg. Co
Refrigerators.
Wine Railway Appliance Co.
Regulators, Oxy-Acetylene.
Oxweld Railroad Service Co., The.

Relays.
General Railway Signal Co.
Railroad Supply Co.
Union Switch & Signal Co.
Westinghouse Elec. & Mfg. Co.

Removers, Paint & Varnish.
Oakite Products, Inc.

Repair Parts, Stoker.
Standard Stoker Co.
Q & C Company, The.

Retorts, Creosoting.
Graver Tank & Mfg. Corp.

Reverse Gear, Power.
Barco Mfg. Co.
Franklin Railway Supply Co., Inc.

Rivet Cutters.
Ingersoll-Rand Co.

Riveters, Hydraulic.
Birdsboro Steel Foundry & Machine Co.

Riveting Machines.
Ingersoll-Rand Co.

Rivets.
Inland Steel Co.
Neely Nut & Bolt Co.
Ryerson & Son, Joseph T.
Pressed Steel Car Co.
Russell, Burdsall & Ward Bolt and Nut Co.

Rods.
Neely Nut & Bolt Co

Rolled Steel.
Carnegie Steel Co.

Roller Bearings—(See Bearings, Roller).

Rolls, Bending & Straightening.
Birdsboro Steel Foundry & Machine Co.

Roof Slabs, Concrete.
Federal American Cement Tile Co.

Roofing, Asbestos.
Carey & Co., Philip, The.
Johns-Manville Corp.
Lehon Co., The.

Roofing, Buildings.
Armco Railroad Sales Co.
Carey Co., Philip, The.
Lehon Co., The.
Johns-Manville Corp.
Superior Sheet Steel Co., The (Division of Continental Steel Corp.).

Roofing, Car.
Armco Railroad Sales Co.
American Sheet & Tin Plate Co.
Carey & Co., Philip, The.
Hutchins Car Rfg. Co.
Johns-Manville Corp.
Lehon Co., The.
Superior Sheet Steel Co., The (Division of Continental Steel Corp.).
Tuco Products Corp.
Union Metal Products Co.

Roofing, Corrugated.
Armco Railroad Sales Co.
American Sheet & Tin Plate Co.
Carey Co., Philip, The.
Johns-Manville Corp.

Roofing, Tile.
Federal American Cement Tile Co.

Roofing, Tile, Cement.
Federal American Cement Tile Co.

Roofing, Tin.
American Sheet & Tin Plate Co.

Rope, Wire — (See Wire Rope).

Rust Preventatives.
Dearborn Chemical Co.
Oakite Products, Inc.

Safe Ends.
National Tube Co.

Sand Drying Plants.
Roberts & Schaefer Co.

Sanitary Products.
West Disinfecting Co.

Sash Balances.
Tuco Products Co.

Saws, Circular Metal.
Ryerson & Son, Joseph T.

Saws, High Speed, Friction.
Ryerson & Son, Joseph T.

Saws, Portable Rail.
Industrial Brownhoist Corp.
Q & C Co., The.

Scales.
Fairbanks-Morse & Co.

Scrapers, Wheeled and Drag.
Western Wheeled Scraper Co.

Screens, Passenger Car.
Tuco Products Corp.

Seats, Car.
Brill Co., The J. G.
Hale-Kilburn Co.
Heywood-Wakefield Co.

Seats, Coach.
Brill Co., The J. G.

Shafting.
Falls Hollow Staybolt Co.
Ryerson & Son, Joseph T.
Sellers & Co., Inc., Wm.
Standard Steel Works Co.

Shapers.
Ryerson & Son, Joseph T.

Shapes, Pressed Steel.
Pressed Steel Car Co.
Sellers & Co., Inc., Wm.

Shapes, Structural.
Bethlehem Steel Co.
Carnegie Steel Co.
Illinois Steel Co.
Inland Steel Co.
Ryerson & Son, Joseph T.

Sheds, Train.
American Bridge Co.
Inland Steel Co.

Sheets, Black and Galvanized.
Allegheny Steel Co.
American Sheet & Tin Plate Co.
Armco Railroad Sales Co.
Inland Steel Co.
Republic Steel Corp.
Ryerson & Son, Joseph T.

Sheets, Blue Annealed.
Allegheny Steel Co.

Sheets, Building, Special Car, Corrugated & Plain.
Armco Railroad Sales Co.

Sheets, Corrugated.
American Sheet & Tin Plate Co.
Armco Railroad Sales Co.
Carey Co., Philip, The.
Carnegie Steel Co.
Johns-Manville Corp.
Ryerson & Son, Joseph T.

Sheets, Corrugated & Plain.
Inland Steel Co.
Ryerson & Son, Joseph T.

Sheets, Electrical.
American Sheet & Tin Plate Co.
Armco Railroad Sales Co.
Republic Steel Corp.
Ryerson & Son, Joseph T.

Sheets, Iron & Steel.
Armco Railroad Sales Co.
Bethlehem Steel Co.
Superior Sheet Steel Co., The (Division of Continental Steel Corp.).

Sheets, Locomotive Jacket.
American Sheet & Tin Plate Co.
Armco Railroad Sales Co.
Inland Steel Co.
Ryerson & Son, Inc., Joseph T.

Sheets, Polished or Planished Iron.
Armco Railroad Sales Co.
American Sheet & Tin Plate Co.

Sheets, Steel.
Armco Railroad Sales Co.
Inland Steel Co.
Ryerson & Son, Joseph T.

Sherardising Plants.
General Electric Co.

Shop Calling Systems—(See Systems, Communication).

Shops, Railroad—(See Buildings, Iron, Steel and Steel Concrete).

Shovels & Draglines.
Industrial Brownhoist Corp.

Shovels, Steam, Gasoline & Electric.
Orton Crane & Shovel Co.

Siding, Iron & Steel.
Armco Railroad Sales Co.

Siding., Bldg., Car, Corrugated & Plain.
Kinnear Mfg. Co.
Armco Railroad Sales Co.
American Sheet & Tin Plate Co.
Inland Steel Co.
Ryerson & Son, Inc., Joseph T.

Siding, Corrugated & Plain.
Carey & Co., Philip, The.
Johns-Manville Corp.

Signal Accessories.
Electric Storage Battery Co.
General Electric Co.
General Railway Signal Co.
Graybar Electric Co.
Railroad Supply Co.
Union Switch & Signal Co.
Westinghouse Elec. & Mfg. Co.

Signals, Automatic Cab.
General Railway Signal Co.
Union Switch & Signal Co.

Signal Blades.
General Railway Signal Co.
Union Switch & Signal Co.

Signals, Crossing.
Union Switch & Signal Co.

Signals, Crossing Protection.
General Railway Signal Co.
Railroad Supply Co.

Signals, Railway.
General Electric Co.
Union Switch & Signal Co.

Sign Posts, Treated.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
National Lumber & Creosoting Co.

Signs, Highway Crossing.
Railroad Supply Co.

Silico Manganese.
Vanadium Corp. of America.

Slabs, Concrete Floor.
Federal Cement Tile Co.

Slag, Blast Furnace.
Carnegie Steel Co.

Slotting Machines.
Sellers & Co., Inc., Wm.

Slotting Machines, Locomotive Cylinder.
American Steel & Wire Co.

Sludge Removers.
Bird-Archer Co., The.

Soap, Liquid.
West Disinfecting Co.

Solder.
National Bearing Metals Corp.
Ryerson & Son, Inc., Joseph T.
Westinghouse Elec. & Mfg. Co.

Spark Arresters.
Locomotive Firebox Co.

Speed Indicators & Recorders.
Valve Pilot Corp.

Spelter—(See Zinc).

Spikes.
American Steel & Wire Co.
Bethlehem Steel Co.
Illinois Steel Co.
Inland Steel Co.
Ryerson & Son, Joseph T.

Splice Bars, Angle.
Carnegie Steel Co.
Illinois Steel Co.
Inland Steel Co.

Spring Plates or Seats.
Allegheny Steel Co.
National Malleable & Steel Castings Co.
Union Spring & Mfg. Co.

Springs.
American Steel Foundries Co.
American Steel & Wire Co.
Baldwin Locomotive Works, The.
Pittsburgh Spring & Steel Co.
Railway Steel Spring Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.
Union Switch & Signal Co.

Springs, Shop Equipment.
Ryerson & Son, Joseph T.

Springs, Vanadium Steel.
Pittsburgh Spring & Steel Co.
Union Spring & Mfg. Co.

Stacks, Steel.
American Bridge Co.
Graver Tank & Mfg. Corp.

Stands, Switch & Target.
Q & C Co., The.

Staybolts.
American Locomotive Co.
Ewald Iron Co.
Ryerson & Son, Joseph T.

Staybolts, Hollow.
Falls Hollow Staybolt Co.
Ryerson & Son, Joseph T.

Steam Chests.
Franklin Railway Supply Co., Inc.

Steam Enclosures, Corrugated Iron.
Republic Steel Corp.

Steam Shovels.
Orton Crane & Shovel Co.

Steel Alloy.
Illinois Steel Co.
Ryerson & Son, Joseph T.
Republic Steel Corp.
Standard Steel Works Co.

Steel, Firebox.
Carnegie Steel Co.
Illinois Steel Co.

Steel & Iron, Stainless.
Allegheny Steel Co.

Steel, Open Hearth.
Carnegie Steel Co.
Illinois Steel Co.

Steel Plate Construction.
Graver Tank & Mfg. Corp.

Steel, Pressed Specialties.
Hale-Kilburn Co.

Steel, Structural.
American Bridge Co.
Carnegie Steel Co.
Graver Tank & Mfg. Corp.
Illinois Steel Co.
Inland Steel Co.
Ryerson & Son, Joseph T.

Steel, Tool.
Illinois Steel Co.
Midvale Co., The.
Q & C Co., The.
Ryerson & Son, Joseph T.

Step Joints.
Q & C Co., The.
Rail Joint Co.

Steps, Car—(See Car Steps. Safety).

Stokers, Locomotive.
Lower Stoker Co.
Standard Stoker Co.

Stokers, Mechanical.
Westinghouse Elec. & Mfg Co.

Stoker Repair Parts.
Lower Stoker Co.
Standard Stoker Co.

Storm Sewers, Corrugated Iron.
Republic Steel Corp.

Strainer, Air.
Westinghouse Air Brake Co.

Strainers, Tank Hose.
Prime Mfg. Co., The.

Stringers, Bridge, Treated.
American Creosoting Co.
Central Coal & Coke Co.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
Curtin-Howe Corp.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.

Structural Shapes, Rolled Shapes.
Carnegie Steel Co.

Superheaters.
Superheater Co., The.

Supports, Bottom Rod Safety.
Chicago Railway Equipment Co.

Switch Boards.
Graybar Electric Co.
Johns-Manville Corp.
Westinghouse Elec. & Mfg. Co.

Switch Machines.
General Railway Signal Co.

Switch Movements.
Union Switch & Signal Co.

Switch Ties, Treated.
American Creosoting Co.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
Curtin-Howe Corp.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.

Switches, Electric.
Electric Service Supplies Co.
General Electric Co.
Graybar Electric Co.
Westinghouse Elec. & Mfg. Co.

Switches & Switch Stands.
Ramapo Ajax Corp.

Syphons, Corrugated Iron.
Republic Steel Corp.

Syphons, Locomotive.
Locomotive Firebox Co.

Syphons, Locomotive, Boilers
Locomotive Firebox Co.

Tables, Welding.
Oxweld Railroad Service Co., The.

Tables, Welding.
Oxweld Railroad Service Co., The.

Tamping Machines, Tie.
Ingersoll-Rand Co.

Tamping Outfits, Tie.
Ingersoll-Rand Co.

Tank Cars.
General American Tank Car Corp., The.

Tanks, Acetylene, Gas.
Oxweld Railroad Service Co., The.

Tanks, Air, Gas, Oil and Water.
Baldwin Locomotive Works, The.
Graver Tank & Mfg. Corp.

Tanks, Water.
American Bridge Co.
American Locomotive Co.
National Tube Co.
Pressed Steel Car Co.
Westinghouse Air Brake Co.

Tape, Insulation.
Johns-Manville Corp.
Westinghouse Elec. & Mfg. Co.

Taps, Staybolt.
Ryerson & Son, Joseph T.

Tele. & Tele. Wire.
American Steel & Wire Co.
Anaconda Wire & Cable Co.
General Electric Supply Corp.

Terminals, Railroad.
United Engineers & Constructors, Inc.

Testers, Boiler.
Sellers & Co., Inc., Wm.

Testers, Gage.
Ashton Valve Co.

Testers, Rail.
Sperry Products, Inc.

Testers, Staybolt.
Flannery Bolt Co.

Testing Machines.
Baldwin-Southwark Corp.

Thermostats.
Gold Car Heating & Lighting Co.
Vapor Car Heating Co., Inc.

Tie Plates.
Bethlehem Steel Co.
Illinois Steel Co.
Inland Steel Company
Railroad Supply Co.

Ties, Creosoted.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.

Ties, Steel.
American Bridge Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Ties, Treated.
American Creosoting Co.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
Curtin-Howe Corp.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.

Tile, Cement, Concrete.
Federal American Cement Tile Co.

Timbers, Pre-framed, Treated
National Lumber & Creosoting Co.

Timber, Treated.
American Creosoting Co.
Central Coal & Coke Co.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
Curtin-Howe Corp.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.
Wood Conversion Co.

Tires.
Firestone Tire & Rubber Co.
General Tire & Rubber Co.
Goodyear Tire & Ruhber Co.
Goodrich Rubber Co., B. F.

Tires, Steel.
Edgewater Steel Co.
Midvale Co., The.
Railway Steel Spring Co.
Standard Steel Works Co.

Toilet Papers
U. S. Envelope Co.

Tools, High Speed Steel.
Bethlehem Steel Co.
Bird-Archer Co., The.

Towers, Floodlight.
Pyle-National Co.

Track Skates.
Q & C Co., The.

Tractors.
Caterpillar Tractor Co.
Elwell-Parker Electric Co.
Industrial Lumber Co.
International Creosoting & Construction Co.

Tractors, Industrial.
Elwell-Parker Electric Co.
International Harvester Co.

Tractors, Turntable.
Nichols & Bro., Geo. P.

Train Control Systems.
General Railway Signal Co.
Union Switch & Signal Co.

Tramways, Wire Rope.
American Steel & Wire Co.

Transfer Tables.
American Bridge Co.
Industrial Brownhoist Corp.
Nichols & Bro., Geo. P.

Transformers.
General Electric Supply Corp.
Railroad Supply Co.
Westinghouse Elec. & Mfg. Co.

Trap Doors.
Edwards Co., O. M.

Trap Doors & Fixtures.
Tuco Products Corp.

Traps, Steam.
Johns-Manville Corp.

Treads, Bridge Floor.
Carnegie Steel Co.

Treads, Safety.
Ryerson & Son, Joseph T.

Treatment Water—(See Water Softening and Purifying).

Truck Frames—(See Frames, Truck).

Trucks, Oxy-Acetylene Supply.
Oxweld Railroad Service Co., The.

Trucks, Car and Locomotive.
American Locomotive Co.
American Steel Foundries.
Baldwin Locomotive Works.
Bettendorf Company, The.
Birdsboro Steel Foundry & Machine Co.
Brill Co., The J. G.
Flexible Truck Co.
Franklin Railway Supply Co., Inc.
Gould Coupler Co.
Mt. Vernon Car Mfg. Co.
Pressed Steel Car Co.
Standard Car Truck Co.
Symington Co., The.

Trucks, Cast Steel Tender.
General Steel Castings Corp.

Trucks, Cast Steel, Electric Car.
General Steel Castings Corp.

Trucks, Cast Steel, Car and Locomotive.
General Steel Castings Corp.

Trucks, Electric Storage Battery.
Elwell-Parker Electric Co.

Trucks, Industrial.
Elwell-Parker Electric Co.

Trucks, Motor.
Dodge Motor Truck Corp.
General Motors Truck Co.
International Harvester Co.
Reo Motor Car Co.
White Co., The.

Trucks, Tender.
Flexible Truck Co.

Trucks, Trailer.
Brill Co., The J. G.
Franklin Railway Supply Co., Inc.

Tubes, Arch.
National Tube Co.

Tubes, Boiler.
Allegheny Steel Co.
Armco Railroad Sales Co.
Bethlehem Steel Co.
Globe Steel Tubes Co.
National Tube Co.
Ryerson & Son, Joseph T.

Tubes, Boiler, Charcoal Iron.
Bethlehem Steel Co.
Reading Iron Co.

Tubes, Staybolt.
Falls Hollow Staybolt Co.

Tubes, Tire.
Firestone Tire & Rubber Co.
Goodyear Tire & Rubber Co.

Tubing.
Aluminum Co. of America.

Tubing, Seamless Steel.
National Tube Co.

Tungsten Metal.
Vanadium Corp. of America.

Turbo Generators.
Electric Service Supplies Co.
General Electric Co.
Pyle-National Co.
Sunbeam Electric Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Turnbuckles.
American Bridge Co.
American Steel & Wire Co.
Ryerson & Son, Joseph T.

Turntable Tractors.
Nichols & Bro., Geo. P.

Turntables.
American Bridge Co.
Industrial Brownhoist Corp.
Nichols & Bro., Geo P.

Typewriter Ribbons.
Remington-Rand Business Service.

Typewriters.
Remington-Rand Business Service.

Uncoupling Device.
Hutchins Car Rfg. Co.

Undercrossings, Corrugated Iron.
Republic Steel Corp.

Underfloor Duct.
General Electric Supply Corp.

Underfloor Duct, Fibre and Metal.
Johns-Manville Corp.

Underframes, Cast Steel, Tender.
General Steel Castings Corp.

Underframes, Cast Steel, Freight Car.
General Steel Castings Corp.

Underframes, Steel.
Bettendorf Co., The.
Brill Co., The J. G.
Pressed Steel Car Co.
St. Louis Car Co.

Underground Conduit.
General Electric Supply Corp.

Upholstery, Car.
Brill Co., The J. G.
Chase & Co., L. C.
Massachusetts Mohair Plush Co.

Valve Caps.
Schrader's Son, Inc., A.

Valve Gears, Locomotive.
Pyle-National Co.

Valves, Air Brake.
Westinghouse Air Brake Co.

Valves, Back Pressure Acetylene.
Oxweld Railroad Service Co., The.

Valves, Blow-Off.
Bird-Archer Co., The.

Valves, Check & Angle Steam
Sellers & Co., Inc., Wm.

Valves, Drifting.
Ardco Mfg. Co.
Sellers & Co., Inc., Wm.

Valves, Hydraulic.
Birdsboro Steel Foundry & Machine Co.

Valves, Piston.
Franklin Railway Supply Co., Inc.

Valves, Pop, Safety & Relief.
Ashton Valve Co.
Vapor Car Heating Co., Inc.
Westinghouse Air Brake Co.

Valves, Pressure Regulating.
Gold Car Heating & Lighting Co.

Valves, Throttle.
American Throttle Co., Inc.
Bradford Corporation.

Valves, Fire.
Schrader's Son, Inc., A.

Varnish Powder.
Aluminum Co. of America.

Varnishes.
General Electric Supply Corp.
Lowe Bros. Co., The
Sherwin-Williams Co.
Vapor Car Heating Co., Inc.
Wine Railway Appliance Co.

Ventilators, Car.
Gold Car Heating & Lighting Co.

Ventilators, Shop & Roundhouse.
Carey Co., Philip, The.
Johns-Manville Corp.

Wardrobes, Rolling and Disappearing Front — (See Lockers).

Washers.
National Malleable & Steel Castings Co.
Ryerson & Son, Joseph T.
Wine Railway Appliance Co.

Washers, Boiler.
Sellers & Co., Inc., Wm.

Waterproofing Materials and Compounds.
Carey Co., Philip, The.
Johns-Manville Corp.
Lehon Co., The.

Water Purifying Materials & Compounds.
Bird-Archer Co., The.
Dearborn Chemical Co.

Water Softening & Purifying.
Bird-Archer Co., The.
Dearborn Chemical Co.
Graver Tank & Mfg. Corp.
Permutit Co., The.

Weather Stripping.
Tuco Products Corp.

Wedges, Automatic.
Franklin Railway Supply Co., Inc.

Wedges, Journal Box.
American Steel Foundries.
Gould Coupler Co.
National Malleable & Steel Castings Co.
Pressed Steel Car Co.
Symington Co., The.

Welding, Electric.
Electric Railweld Service Corp.

Welding Machines, Acetylene.
Oxweld Railroad Service Co., The.
Ryerson & Son, Joseph T.
Westinghouse Elec. & Mfg. Co.

Welding Machines, Electric.
General Electric Co.
Ryerson & Son, Joseph T.

Welding Machines, Flue.
Ryerson & Son, Joseph T.

Welding Materials.
Oxweld Railroad Service Co.
Franklin Railway Supply Co., Inc.

Welding Process.
Oxweld Railroad Service Co.

Welding Rods.
American Steel & Wire Co.
General Electric Supply Corp.
Oxweld Railroad Service Co., The.
Ryerson & Son, Joseph T.

Welding Supplies.
General Electric Co.
Oxweld Railroad Service Co., The.

Welding and Cutting Apparatus—(See Cutting and Welding Apparatus).

Well Casings, Corrugated Iron.
Armco Culvert Mfrs. Assoc.
Republic Steel Corp.

Wheel Centers, Driving.
American Locomotive Co.
American Steel Foundries.
Baldwin Locomotive Works, The.
Birdsboro Steel Foundry & Machine Co.
Edgewater Steel Co.
Hunt-Spiller Mfg. Corp.
Standard Steel Works Co.
Union Steel Casting Co.

Wheels, Car and Locomotive.
American Locomotive Co.
American Steel Foundries.
Baldwin Locomotive Works, The.
Bethlehem Steel Co.
Carnegie Steel Co.
Edgewater Steel Co.
Griffin Wheel Co.
Illinois Steel Co.
Mt. Vernon Car Mfg. Co.
Pressed Steel Car Co.
Railway Steel Spring Co.
Standard Steel Works Co.

Wheels, Cast Iron, Chilled Tread.
Assn. of Mfrs. of Chilled Car Wheels.
Graybar Electric Co.
Griffin Wheel Co.
Mt. Vernon Car Mfg. Co.
Pressed Steel Car Co.

Wheels, Mine Car.
Carnegie Steel Co.
Edgewater Steel Co.
Griffin Wheel Co.
Mt. Vernon Car Mfg. Co.
Standard Steel Works Co.

Wheels, Passenger Car.
Carnegie Steel Co.
Illinois Steel Co.
Edgewater Steel Co.
Griffin Wheel Co.
Pullman Car & Mfg. Corp.
Standard Steel Works Co.

Wheels, Steel and Steel Tired.
American Locomotive Co.
American Steel Foundries.
Carnegie Steel Co.
Edgewater Steel Co.
Illinois Steel Co.
Lima Locomotive Works.
Railway Steel Spring Co.
Standard Steel Works Co.

Wheels, Wrought Steel.
Armco Railroad Sales Co.
Bethlehem Steel Co.
Carnegie Steel Co.
Edgewater Steel Co.
Standard Steel Works Co.

Whistles.
Ashton Valve Co.

Whistles, Locomotive.
General Electric Co.
Westinghouse Air Brake Co.

Window Fixtures.
Edwards Co., O. M.
Tuco Products Corp.

Wire.
American Steel & Wire Co.
Kerite Insulated Wire & Cable Co.

Wire, Fence.
American Steel & Wire Co.

Wire, Insulated.
American Steel & Wire Co.
Anaconda Wire & Cable Co.
General Electric Co.
Graybar Electric Co.
Kerite Insulated Wire & Cable Co.

Wire, Rail Bond.
American Steel & Wire Co.
Graybar Electric Co.

Wire Rope Clips.
American Steel & Wire Co.

Wire Rope.
American Steel & Wire Co.

Wire, Telephone & Telegraph.
American Steel & Wire Co.
Anaconda Wire & Cable Co.
Graybar Electric Co.

Wire, Welding.
American Steel & Wire Co.
Oxweld Railroad Service Co., The.

Wiring Appliances.
Pyle-National Co.

Wood, Treated.
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
Curtin-Howe Corp.
National Lumber & Creosoting Co.

Wood Preservative — (See Preservative, Wood).

Wood, Preservative Treatment (Zinc Meta Arsenite).
Century Wood Preserving Co.
(Division of the Wood Preserving Corp.)
National Lumber & Creosoting Co.

Wrecking Cranes — (See Cranes, Wrecking).

Z M A Wood Preservative
(Zinc Meta Arsenite).
Curtin-Howe Corp.

Index To Advertisers

A

Allegheny Steel Co. 31
American Arch Co., Inc., The 17
American Brake Shoe & Foundry Co. 31
American Bridge Co. 21
American Locomotive Co. ..18, 19
American Steel Foundries .. 11
Armco Railroad Sales Co. 2
Ashton Valve Co., The 31

B

Baldwin Locomotive Works, The 10
Battey & Kipp, Inc. 32
Bird-Archer Co., The 29
Bixby, Inc., R. W. 32
Buffalo Brake Beam Co. 31
Buyers' Index 33, 34, 35, 36, 37, 38, 39

C

Camel Co. 30
Caterpillar Tractor Co. 13
Classified Advertisements ... 32

E

Edgewater Steel Co. 31
Elwell-Parker Elec. Co., The 9

F

Falls Hollow Staybolt Co. ... 31
Firebar Corporation 23
Franklin Railway Supply Co., Inc. 16

G

Get Together Department .. 32
Grip Nut Co., The 42
Gulick-Henderson Co. 32

H

Harbison-Walker Refractories Co. 17
Hunt Co., Robert W. 32
Hunt-Spiller Mfg. Corp. 24
Hutchins Car Roofing Co. ... 14
Hymans-Michaels Co. 32

I

Illinois Steel Co. 20
Iron & Steel Products, Inc. 32

K

Kerite Insulated Wire & Cable Co., The 29

L

Lima Locomotive Works, Inc. 15
Locomotive Firebox Co .... Front Cover

M

Magnus Co. 29
McConway & Torley, Inc. ... 29
Miner, Inc., W. H. 3
Mt. Vernon Car Co. 30
Muhlfeld, John E. 32

N

Nichols & Bro., Geo. P. ... 31

O

Ohio Locomotive Crane Co. 30

P

P & M Co., The 31
Pittsburgh Testing Laboratory 32
Professional Directory 32

R

Railroad Supply Co., The ... 31
Railway Educational Bureau, The 32
Republic Steel Corp. 22

S

SKF Industries, Inc. 41
Standard Car Truck Co. 30
Standard Steel Works Co. ... 4
Standard Stoker Co., The .. 26
Stucki Co., A. 31
Superheater Co., The 27

T

Timken Roller Bearing Co., The 6, 7
Tuco Products Corp. 31

U

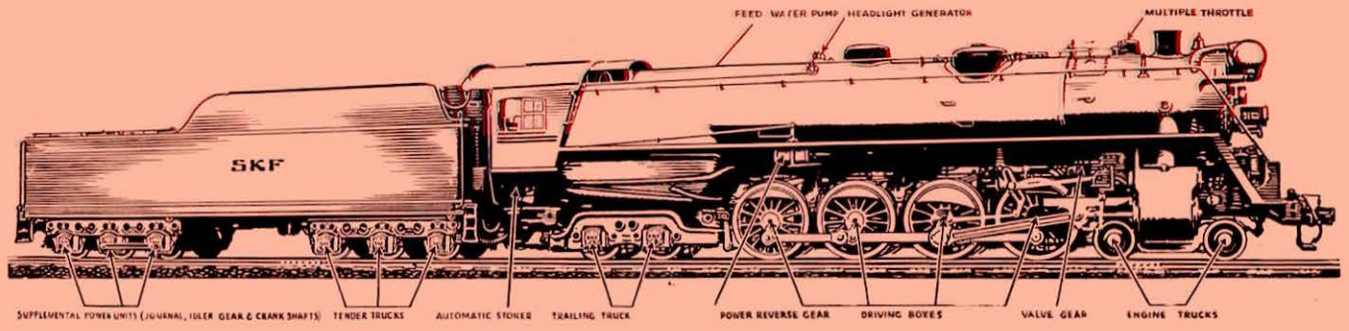
Union Asbestos & Rubber Co. 31
Union Metal Products Co. 8
Union Spring & Mfg. Co. ... 31
Union Steel Casting Co. ... 31

V

Vacuum Oil Co. 12

W

Western Wheeled Scraper Co. 31
Westinghouse Air Brake Co. 25
Westinghouse Elect. & Mfg. Co. 28
Wine Railway Appliance Co., The 31



Modern SKF Bearings

Serve the modern locomotive

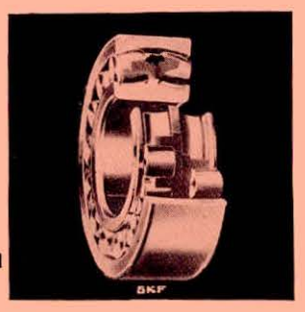
HIGH speeds, heavy loads, longer periods of service have necessitated an increasing use of anti-friction bearings on the locomotive.

The above diagram illustrates places where SKF is already giving dependable service.

In its service to the railroads SKF is not confined to one type of bearing. SKF is versatile in organization and in products. A wide diversity of service and conditions is met with a bearing and design ideally suited for the specific purpose.

2783

SKF
JOURNAL BEARINGS



SKF INDUSTRIES, INCORPORATED, 40 East 34th Street, New York, N. Y.

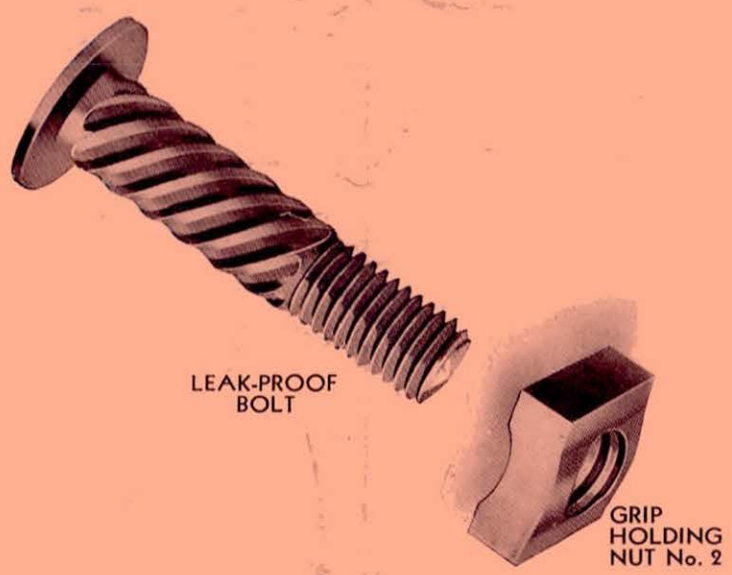
Plug the Leaks—Stop the Losses

LEAK-PROOF

the NEW Bolts

Pat. Applied For

COMPANIONS TO GRIP NUTS



The self-countersinking head—eliminates the broken fibres of the wood—splinters that cause damage claims—forms and fills its own countersink cup—simplifies car cleaning—saves labor—prevents rotting of siding due to moisture getting in the bolt hole—reduces repair costs.

The LEAK-PROOF BOLT that prevents moisture entering the car through the bolt hole and the Grip Lock Nut that holds everything tight will do a dependable and economical job on your equipment as it has done on the equipment of others.

Tested and Proven in Shop Practice

GRIP NUT COMPANY

5917 SOUTH WESTERN AVENUE « « « CHICAGO, ILLINOIS